PB-245 733

REPORT ON ANDROSCOGGIN RIVER, NEW HAMPSHIRE-MAINE

Robert A. Taft Sanitary Engineering Center
Cincinnati, Ohio

August 1962

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

282035

PB 245 733

REPORT ON AMMONOOSUC RIVER

New Hampshire-Maine

BY A. D. SIDIO
PUBLIC HEALTH ENGINEER
POLLUTION EVALUATION UNIT
F. W. KITTRELL, IN CHARGE

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
US Department of Commerce
Springfield, VA. 22151

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
PUBLIC HEALTH SERVICE
ROBERT A. TAFT SANITARY ENGINEERING CENTER

CINCINNATI, OHIO

AUGUST 1962

BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No. PB245733

4. Title and Subtitle
Reporton Androscoggin River, New Hampshire - Maine

5. Report Date
August 1962

6.

7. Author(s)
A. D. Sidd

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
U.S. Dept. of Health, Education, & Welfare
Public Health Service
Cincinnati, Ohio.

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address
U.S. Dept. of Health, Education, & Welfare
Public Health Service
Cincinnati, Ohio.

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstracts
The report presents a review of existing data, & certain calculations based on stream function & behavior the effects of wastes on water quality are discussed along with a discussion of the uses of the water & damages to water uses created by wastes.

17. Key Words and Document Analysis. 17a. Descriptors
* Water quality
* Stream Pollution
Industrial Wastes
Sewage

17b. Identifiers/Open-Ended Terms
* Androscoggin River

17c. COSATI Field/Group

PRICES SUBJECT TO CHANGE

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Release Unlimited	UNCLASSIFIED	68
	20. Security Class (This Page) UNCLASSIFIED	22. Price 4.25-2.25

FORM NTIS-35 (REV. 10-73) ENDORSED BY ANSI AND UNESCO. THIS FORM MAY BE REPRODUCED USCOMM-DC 8265-P74

TABLE OF CONTENTS

	PAGE NO.
Background	1
The Area	6
Sources of Data	8
Chemical & Physical Data	9
Coliform Bacteria Data	9
Flow Data	10
Sources of Pollution	11
Effects of Wastes on Water Quality	14
Biochemical Oxygen Demand - (B.O.D.)	14
Comparison, 1941-1961 B.O.D. Data	15
Dissolved Oxygen (D.O.)	16
Coliform Bacteria	18
Color	20
Physical Observations	21
Water Uses	22
Damages To Water Uses	23
Summary and Conclusions	26
References	29
APPENDIX A	by Stations
APPENDIX B	B-1 to B-3
APPENDIX C	C-1 to C-4

LIST OF TABLES

FOLLOWS PAGE

Table No. 1..... 8
Table No. 2..... 8
Table No. 3..... 11
Table No. 4..... 11

LIST OF CHARTS

FOLLOWS PAGE

Chart No. 1..... 6
Chart No. 2..... 11
Chart No. 3..... 12
Chart No. 4..... 14
Chart No. 5..... 14
Chart No. 6..... 16
Chart No. 7..... 19

REPORT ON ANDROSCOGGIN RIVER

New Hampshire-Maine

August 1962

BACKGROUND

The condition of the Androscoggin River has long been a matter of concern. In 1930 a study was made of five industrial rivers in the state of Maine including the Androscoggin.[1] Results of the study showed the Androscoggin to be heavily polluted.

During the summer months of 1940, 1941 and 1942 particularly obnoxious conditions existed due to the pollutional load in the river. At Lewiston, hydrogen sulfide odors were highly objectionable and concentrations of the gas in the atmosphere were sufficient to tarnish exposed metals and to discolor painted surfaces. Public demand for relief resulted in efforts to improve the condition of the river.

In 1940 the Central Maine Power Company retained Metcalf and Eddy of Boston to investigate the Androscoggin River.[2] During the study, in the middle of September, the river was found to be almost completely devoid of dissolved oxygen from Berlin, New Hampshire, to Lewiston, Maine.

In 1941 the Maine legislature created the Sanitary Water Board. The first consideration of the board was the polluted condition of the Androscoggin River from the New Hampshire-Maine state line to the Lewiston-Auburn area. In August 1941 the board retained Metcalf and Eddy to make

a survey of the river and to recommend remedial measures. A report prepared on the findings of the survey was submitted to the board in February 1942. The report was issued as Bulletin No. 1 of the Maine Sanitary Water Board.[3]

Field investigations for the report were made from August to December 1941. Dissolved oxygen was absent from above Rumford to below Lewiston. In addition to the odors large masses of gas-lifted solids floated on the surface of the river. Above the dam below Berlin the area of floating solids was estimated at four or five acres.

The report, dealing with the effects of organic wastes, summarized that of the total pollutional load in the Androscoggin River, 96 percent was from industrial sources, 92 percent was from the pulp and paper mills, and about 71 percent of the total pollution was in the form of concentrated sulfite digester liquors. Total industrial pollution was estimated at 2,500,000 population equivalents.

Remedial measures were recommended to control pollution following the studies. Failure of the pulp and paper mills to begin remedial action resulted in the filing of an information by the Attorney General of the State of Maine with the Supreme Judicial Court of Equity for Androscoggin County in May 1942 relative to pollution by the mills and its alleged effects, requesting the court to grant relief.

In December 1942 a stipulation was entered into by the mills and the Attorney General. The mills agreed to undertake remedial measures pending further legal action after October 1943. The stipulation provided that the mills conduct a program of sampling and analysis of the river, build an experimental lagoon for sulfite waste, restrict discharge of

sulfite liquor and furnish data to the Attorney General.

Provisions of the stipulation of 1942 failed to provide relief. In January 1944 the court issued a decree requiring the mills to maintain the sampling and analysis program during the critical season from May through September, and to further restrict production. Again the measures called for were inadequate and odor conditions were very bad the following summer in the Lewiston-Auburn area.

In December of 1947 a court decree placed additional restrictions on production during the critical season. The decree also provided for the construction of a lagoon at the International Paper Company Plant. Dr. Walter A. Lawrence of Bates College was designated to supervise the operation of the lagoon to maintain 4 ppm dissolved oxygen at the North Turner Bridge at the head of the slackwater formed by the Gulf Island Dam.

Odor conditions occurred again in the Lewiston-Auburn area during the summer of 1948. The decree of 1948 appointed Dr. Lawrence as administrator with authority to regulate activities of the pulp and paper mills relative to the pollution of the river. The decree placed additional restrictions on the discharge of sulfite waste liquors. These restrictions were based on season, river flows, water temperature and the dissolved oxygen content at North Turner Bridge. Dissolved oxygen at North Turner was to be maintained at 4 ppm. The administrator was given authority to require the addition of soluble nitrate when the dissolved oxygen level became critical.

The most recent decree established discharge quotas based on a "Pollution Factor" of 1.75. The equivalent tons of sulfite waste liquor that could be discharged was calculated by multiplying the million cubic

feet of water flowing during the preceding week by the 1.75 factor. In 1953 an agreement was entered into between the companies and the administrator to determine quotas based on a Pollution Factor of 1.30. This Pollution Factor, as calculated, has been reduced from 5.0 in 1941 to 0.49 in 1960, and estimated at 0.2 for 1961. The factor is based on equivalent tons of sulfite waste liquor discharged.

Sodium nitrate has been used as a control measure in the Gulf Island Pool. The nitrate provided a source of oxygen when the dissolved oxygen content in the river became critical. From 1948 through 1960 a total of 6,694 tons of sodium nitrate was used at a cost of approximately $500,000. Use of the nitrate served as an odor control measure pending mill process changes.

Pollution of the river resulting from the discharge of sulfite waste liquor has been reduced by several means. The closing of several mills has resulted in a reduced pollution load. In 1958 the Brown Company placed its magnesium base sulfite process in operation at Berlin. In this process about 90 percent of the sulfite waste liquor is evaporated and burned for the recovery of heat and chemicals. In 1961 the Oxford Paper Company completed its new Kraft Mill, replacing two sulfite mills.

By regulated production, controlled discharge by use of lagoons, and process changes, the sulfite pollution load to the river during the summer of 1961 was estimated to have been reduced to about 5 percent of that during the summer of 1941. It should be noted that this percentage is based on sulfite waste liquor pollution only, and does not consider the total organic pollutional load being discharged.

Data submitted to the Maine Attorney General's office by the Administrator indicate the obnoxious conditions resulting from the release of hydrogen sulphide to the atmosphere from the river have been corrected. The data shows that no objectionable odors have been recorded in the Lewiston-Auburn area during the past three summers of 1959, 1960 and 1961.

To this time efforts to regulate pollution have been directed toward the prevention of a public nuisance. Pollution discharged to the river has been reduced, but adverse effects have not been eliminated. The improved conditions have resulted primarily from the various measures of the Brown, Oxford, and International Pulp and Paper Companies at Berlin, New Hampshire, and Rumford and Livermore Falls, Maine. Numerous other industries continue to discharge untreated wastes along with the untreated municipal sewage of some 101,400 people.

This report presents a review of existing data, and certain calculations based on stream function and behavior. The section of the Androscoggin River considered extends from a point upstream from Berlin, New Hampshire to its mouth in Merrymeeting Bay along the coast of Maine.

THE AREA

The Androscoggin River begins at Errol Dam at the outlet of Umbagog Lake. The river flows in a southerly direction through New Hampshire to Gorham where it turns in an easterly direction into Maine. The stream then flows easterly and southerly to its mouth at Merrymeeting Bay. The tidal effect extends upstream to Brunswick, Maine.

The section of the river of concern in this report extends from a point above Berlin, New Hampshire to its mouth in Maine, and is shown in Chart 1. In this reach the river flows through Coos County, New Hampshire and Oxford, Franklin, Androscoggin, Cumberland and Sagadahoc Counties in Maine.

Sources of wastes are indicated on Chart 1, along with the sampling stations used in collecting the existing data.

The drainage area above Berlin amounts to approximately 1,350 square miles. An additional 2,100 square miles are in the Androscoggin basin below Berlin. Approximately 85 percent of the basin is in forest land. Lakes and ponds occupy about 4 percent of the basin area, and about 5.5 percent is in cropland.[4]

Approximately 725,000 acre-feet of usable water storage is provided in the basin. About 90 percent of this storage is above Errol Dam.

6-a

ANDROSCOGGIN RIVER
NEW HAMPSHIRE – MAINE
CHART I

The storage is used primarily for the benefit of industrial uses and power production. Flow in the river is well regulated, and at Berlin is generally controlled between a minimum of 1,550 and a maximum of 2,500 cubic feet per second.

Economy of the area is based principally on agriculture, lumbering, industry and recreation.

SOURCES OF DATA

Data available are limited to the summer sampling periods and to the sampling stations listed in Table 1. The location and number of stations are inadequate to permit a complete breakdown of industrial contributions, or tributary contributions to the main stem. A complete analysis of the industrial and municipal pollution loads would require sampling of the sources and additional sampling points along the river and tributaries above, below and between the discharges.

Data obtained during the summers of 1957 through 1961 are recorded in Appendix A. Values are the maximum, minimum, and average values for the months of June through September. The tables include data on flow, temperature, pH, dissolved oxygen, biochemical oxygen demand and color.

A summary of 1961 data for flow, dissolved oxygen, biochemical oxygen demand, and color are presented in Table No. 2.

REPORT ON

ANDROSCOGGIN RIVER

New Hampshire-Maine

TABLE NO. 1

SAMPLING STATIONS

Station Number	Station Name	Mile Point	Station Description
1	Bells	138.8	Bridge about 4 miles above Berlin, N. H.
2	Twin State	130.4	Below Berlin
3	Gilead	119.2	By Bridge (Approx. 3 miles below State Line)
4	Bethel	109.0	Route 2 Bridge
5	Rumford Point	92.7	Bridge at old ferry site
6	Rumford	87.6	Virginia Bridge at upper edge of Rumford
7	Dixfield	82.0	At Bridge
8	Riley	65.5	Bridge midway between North Jay and Riley
9	North Turner	49.0	Bridge on Highway 219
10	Turner Center	42.0	Bridge on small road to Route 202
11	Gulf Island	34.4	Dam opposite East Auburn
11a	Deer Rips	33.7	Between bridge at Lewiston and Gulf Island Dam
11b	Lewiston	30.5	In Lewiston Canal
12	Lisbon Falls	15.7	Bridge at Lisbon Falls

REPORT ON THE ANDROSCOGGIN RIVER
New Hampshire-Maine

TABLE NO. 2

SUMMARY OF 1961 DATA

Station (Mile Point)	Miles below Berlin	1961 Date	Avg. Yield cfs/S.M.	Avg. Flow cfs	Days from Berlin	Dissolved Oxygen mg/l	Dissolved Oxygen 1000 lbs/day	B.O.D. mg/l	B.O.D. 1000 lbs/day	Color
1		Jun	2.05	2645		8.62	124	1.1	16	39
		Jul	1.53	1969		7.38	78	1.0	10	37
		Aug	1.62	2085		7.50	84	1.0	11	37
(MP 138.8)	-4	Sep	1.54	1992		7.60	82	0.8	9	36
		Avg	1.68	2173	-0.2	7.78	92	1.0	12	37
2		Jun	1.95	2948		8.17	133	9.7	148	72
		Jul	1.37	2078		6.44	72	10.3	116	72
		Aug	1.41	2125		6.34	73	12.7	146	81
(MP 130.4)	5	Sep	1.34	2027		6.34	69	12.3	135	66
		Avg	1.52	2294	0.3	6.82	87	11.25	136	73
3		Jun	1.89	3100		7.71	133	7.2	117	71
		Jul	1.31	2153		4.91	57	11.8	139	88
		Aug	1.31	2149		4.56	53	9.8	114	85
(MP 119.2)	16	Sep	1.25	2048		5.13	57	10.9	120	74
		Avg	1.44	2362	0.6	5.58	75	9.92	122	80
4		Jun	1.87	3170		7.78	137	6.9	115	70
		Jul	1.29	2188		5.73	67	8.0	95	81
		Aug	1.27	2160		4.76	56	7.8	90	81
(MP 109.0)	26	Sep	1.21	2058		5.00	56	8.2	92	72
		Avg	1.41	2394	1.0	5.82	79	7.72	98	76
5		Jun	1.80	3709		6.71	139	4.5	84	71
		Jul	1.15	2368		4.24	53	4.4	56	94
		Aug	1.06	2227		2.76	33	4.5	54	92
(MP 92.7)	42	Sep	1.03	2118		3.74	43	3.1	36	71
		Avg	1.26	2606	1.7	4.36	67	4.1	58	82
6		Jun	1.79	3746		6.03	128	3.1	62	73
		Jul	1.15	2410		4.15	53	3.0	39	88
		Aug	1.07	2232		2.04	25	3.0	37	93
(MP 87.6)	47	Sep	1.02	2123		3.04	35	2.5	29	81
		Avg	1.26	2628	2.4	3.82	60	2.9	42	84
7		Jun	1.79	4019		7.34	167	5.3	106	82
		Jul	1.15	2502		5.49	76	5.8	81	101
		Aug	1.06	2332		3.39	44	6.6	85	114
(MP 82.0)	53	Sep	1.02	2274		4.10	50	5.8	72	108
		Avg	1.26	2617	2.7	5.08	84	5.9	86	101
8		Jun	1.67	4105		6.34	141	4.5	93	76
		Jul	1.07	2637		4.41	62	4.4	62	94
		Aug	0.99	2444		1.49	20	4.5	60	112
(MP 65.5)	69	Sep	0.94	2322		1.93	24	3.2	40	100
		Avg	1.17	2877	4.6	3.54	63	4.2	64	96
9		Jun	1.58	4167		6.75	160	4.4	94	74
		Jul	1.01	2678		5.14	74	4.1	60	90
		Aug	0.94	2481		2.64	35	3.7	50	106
(MP 49.0)	86	Sep	0.89	2358		3.31	42	3.4	43	102
		Avg	1.11	2921	6.0	4.46	78	3.90	62	93
10		Jun	1.51	4219		6.35	152	3.8	83	71
		Jul	0.97	2710		3.67	53	3.6	53	110
		Aug	0.90	2512		1.99	27	3.2	43	110
(MP 42.0)	93	Sep	0.85	2387		3.32	43	2.4	31	105
		Avg	1.06	2957	7.5	3.83	69	3.25	52	99
11		Jun	2.20	5780		5.12	173	2.2	68	66
		Jul	1.52	4345		0.44	10	1.9	44	84
		Aug	1.22	3492		0.28	5	2.2	41	93
(MP 34.4)	101	Sep	1.15	3298		1.22	36	1.0	19	90
		Avg	1.52	4229	11.0	1.94	56	1.8	43	83
11a		Jun	2.20	5780		5.35	182	2.3	70	71
		Jul	1.52	4345		1.08	26	2.3	54	92
		Aug	1.22	3492		0.43	8	2.2	41	93
(MP 33.7)	101	Sep	1.15	3298		1.58	30	1.2	22	98
		Avg	1.52	4229	11.1	2.11	62	2.0	47	88
11b		Jun	2.20	5780		5.93	200	2.4	73	69
		Jul	1.52	4345		1.37	32	2.0	46	90
		Aug	1.22	3492		1.00	19	1.5	29	95
(MP 30.5)	105	Sep	1.15	3298		2.32	43	1.2	21	98
		Avg	1.52	4229	11.3	2.66	74	1.8	42	88
12		Jun	1.88	6360		9.18	320	2.9	102	68
		Jul	1.39	4705		6.22	209	1.8	46	84
		Aug	1.09	3677		7.98	159	1.9	37	90
(MP 15.7)	119	Sep	1.05	3530		7.84	151	1.6	31	92
		Avg	1.35	4568	12.5	8.30	210	2.0	54	84

CHEMICAL AND PHYSICAL DATA

Chemical and physical data used in the preparation of this report were reproduced from documents on file in the Attorney General's office, Augusta, Maine. The documents include results of determinations made on samples collected from the river as follows:

1. Temperature (°C).
2. Dissolved Oxygen (D.O.).
3. 5-day - 20° C. Biochemical Oxygen Demand (B.O.D.).
4. Hydrogen Sulphide (H_2S).
5. Color.
6. Turbidity.
7. Sedimentation.
8. Fungus.
9. Gas.
10. Sludge.
11. Wind Direction.
12. Odor.
13. Hydrogen Ion Concentration (pH).

These sample analyses are made weekly during the period from about May 15 to October 15 each year.

Analyses performed in the collection of data presented to the Attorney General are under the direction of a court appointed administrator, and are conducted and paid for by industry. The Brown Company is responsible for the section from above Berlin to Bethel (Stations 1 through 4) and the Oxford Paper Company for the section from Rumford Point to Lisbon Falls (Stations 5 through 12).

Table 1 lists the sampling stations by number, name, river miles from mouth, and description. The stations are also indicated on Chart 1.

COLIFORM BACTERIA DATA

The bacteriological calculations presented in this report have been based on sewered population figures in the "Summary Report on Quality of Interstate Waters - Androscoggin River (New Hampshire-Maine - September

1961)." The sewered population figures used in the summary report were obtained from, unpublished data, "1962 Inventory, Municipal and Industrial Waste Facilities - U. S. Department of Health, Education, and Welfare." The data were reviewed with the States of New Hampshire and Maine in September and November 1961, respectively.

Densities of bacteria of the coliform group at the various points in the river have been calculated, based on multiplication and die-off of this group of bacteria discharged in normal domestic sewage into the river, without consideration of the effects of other nutrients or toxins.

Coliform bacteria densities calculated downstream from the sources of raw sewage are listed in Appendix C. For convenience it was assumed that no coliform bacteria were present at the Bells sampling station above Berlin. Appendix C. includes average flow values for August 1959 and the total number of coliform bacteria, in billions, passing the various points on the river in a day. Flow data for August 1959 were used as a typical month.

FLOW DATA

Flow data have been obtained from the U. S. Geological Survey. Gaging stations are located at Errol, Gorham, Rumford and Auburn on the Androscoggin. Gages are also operated on the Swift, Nezinscot and the Little Androscoggin rivers.

Flows at each of the sampling stations were calculated as described in Appendix B.

SOURCES OF POLLUTION

The major sources of pollution in the Androscoggin River are the industrial waste and municipal sewage discharges. The points of waste discharges are indicated on Chart 1.

There are fourteen sewered communities contributing untreated wastes to the river in the reach considered. These communities are listed in Table 3. The table also lists the contribution of bacterial pollution to the stream from each of the communities. Chart 2 presents the sources of sewage discharged to the Androscoggin between Berlin, New Hampshire, and its mouth. The areas of the circles indicate the relative bacterial contributions from the various sources.

Rumford and Mexico have had a preliminary survey made for joint waste treatment facilities. The report was completed in October 1961, and considered the pulp and paper mill wastes in addition to the municipal sewage. In 1959 a preliminary survey of joint sewerage facilities for Norway and South Paris was completed.

Table 4 lists the known sources of organic waste being discharged to the river. This table lists both municipal and industrial sources.

REPORT ON

ANDROSCOGGIN RIVER

New Hampshire-Maine

TABLE NO. 3

SEWERED COMMUNITIES

New Hampshire	River Mile	Bacterial Population Equivalent to Stream	
Berlin	135	15,000	
Gorham	128	2,500	
Maine		Sub-total	17,500
Bethel	106	1,200	
Rumford	84	8,000	
Mexico	82	3,000	
Dixfield	79.5	1,200	
Livermore Falls	59	2,600	
Auburn	28.5	14,500	
Lewiston	28	31,000	
*South Paris	27-23	1,500	
*Norway	27-22	2,800	
*Mechanic Falls	27-12	1,400	
		Sub-total	84,700
Lisbon Falls	15	2,200	
Brunswick	6	14,500	
		Total	101,400

*Discharge to tributaries

REPORT ON

ANDROSCOGGIN RIVER

New Hampshire-Maine

TABLE NO. 4

SOURCES OF ORGANIC WASTES

	River Mile	BOD Population Equivalents	
New Hampshire		Individual Sources	Total for Area
Berlin	135	15,000 (1)	906,000
Brown Company		891,000 (2)	
Gorham	128	2,500 (1)	2,500
Maine			
Bethel	106	1,200 (1)	1,200
Rumford) Mexico)	83	11,000 (1)	318,000
Oxford Paper Company		307,000 (2)	
Dixfield	79.5	1,200 (1)	1,200
Livermore Falls	59	2,600 (1)	78,000
International Paper Co.		75,400 (2)	
Auburn	28.5	14,500 (1)	
Lewiston	28	31,000 (1)	
Bates Mfg. Co.			
Cotwool Mfg. Co.			
W. S. Libbey Co.			
North American Phillips Co.			
Little Androscoggin River			
South Paris	27-23	1,500 (1)	
A. C. Lawrence Leather Co.			
Burnham & Morrill Co.			
Oxford (T)	27-19	D.N.A. (3)	
Robinson Mfg. Co.			

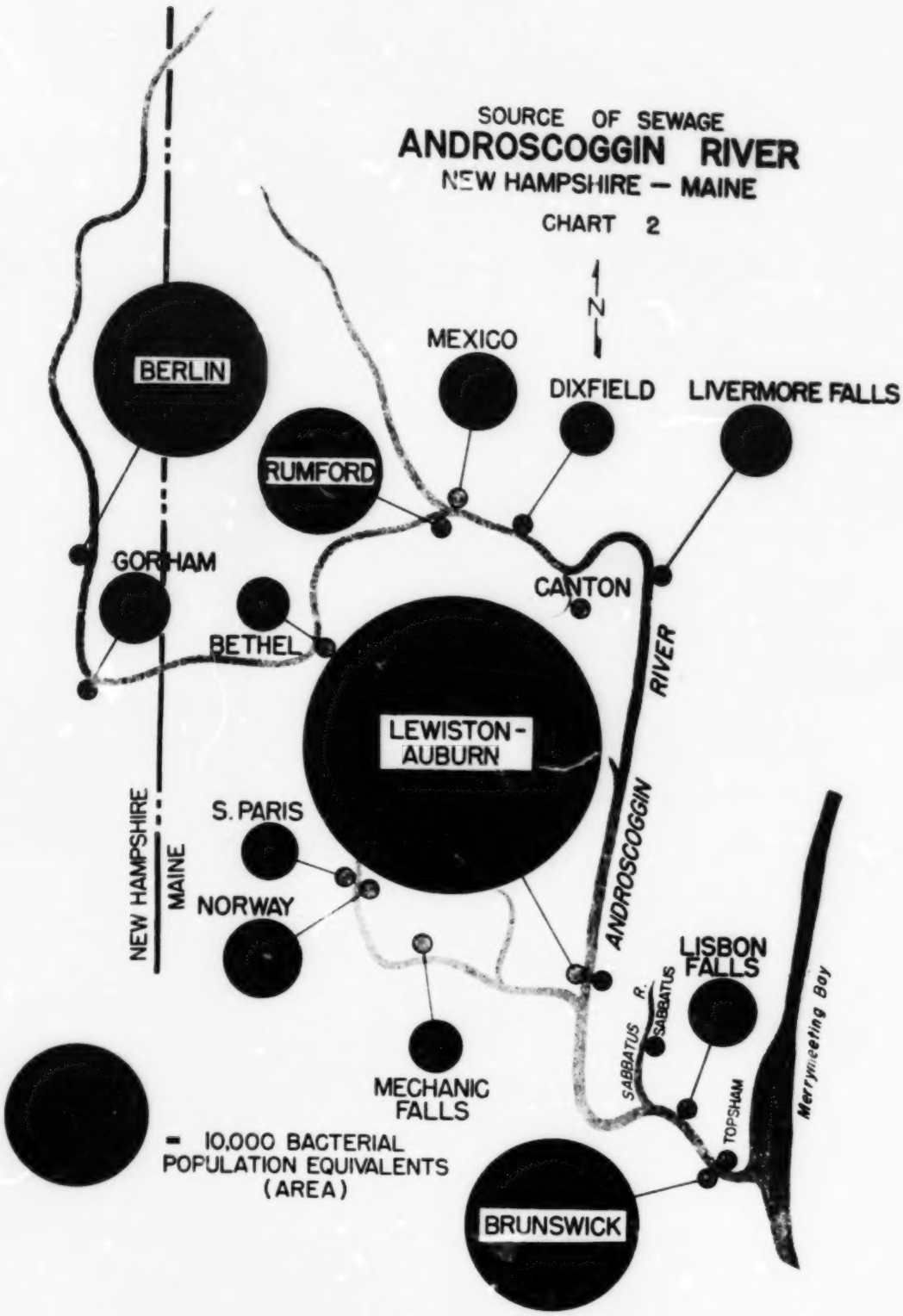
TABLE 4 - Continued

Little Androscoggin River	River Mile	BOD Population Equivalents Individual Sources	Total for Area
Mechanic Falls	27-12	1,400 (1)	
Water Falls Tissue Co.			
Poland (T)	27-11	D.N.A. (3)	
Rogers Fibre Co., Inc.			
Norway	27-22	2,800 (1)	
Sub-Total (Lewiston-Auburn area and Little Androscoggin River, Municipalities & Industries) Municipal - 51,200 (1) Industry - 116,800 (2)			168,000
Totals		(1) 84,700 (2) 1,390,200	1,474,900

(1) Municipal Sewage

(2) Industrial Waste

(3) D.N.A. Does not apply -- Municipal sewage not discharged to stream.


SOURCE OF SEWAGE
ANDROSCOGGIN RIVER
NEW HAMPSHIRE – MAINE
CHART 2
N
BERLIN
MEXICO
DIXFIELD
LIVERMORE FALLS
RUMFORD
GORHAM
CANTON
BETHEL
LEWISTON-AUBURN
ANDROSCOGGIN RIVER
S. PARIS
NEW HAMPSHIRE
MAINE
NORWAY
LISBON FALLS
SABBATUS R.
SABBATUS
MECHANIC FALLS
TOPSHAM
Merrymeeting Bay
BRUNSWICK
= 10,000 BACTERIAL POPULATION EQUIVALENTS (AREA)

Available data do not permit a complete breakdown of the industrial contributions. Data listed in Table 4 have been calculated from stream data collected during the summer of 1961, and the most recent information available on sewered populations for the municipalities.

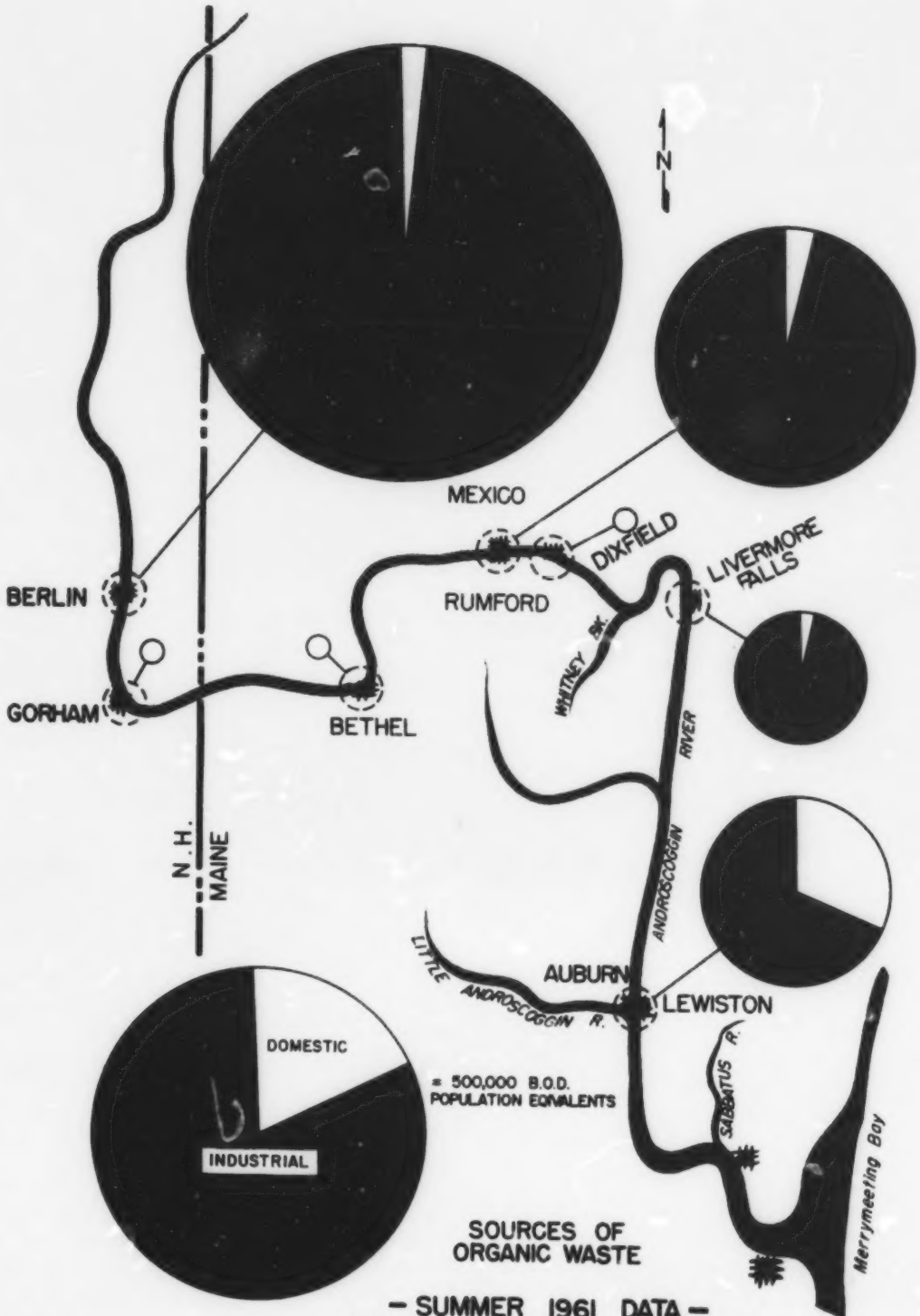
Chart 3 presents the Biochemical Oxygen Demand Population equivalents from each area. Calculations were based on 1961 river data and sewered populations. Here the areas of the circles indicate the relative organic contribution from each area. The shaded areas represent the industrial portions of the total contributions, and the clear areas the municipal sewage portions.

The Biochemical Oxygen Demand reduction rates were calculated for the river sections below the major sources of wastes. By projecting the loads at the calculated rates to the source, the organic contribution of each area was determined. The results obtained by this method are the values used in Table 4, and indicated on Chart 3. Domestic and industrial wastes have been differentiated using sewered population figures for the municipalities. The data available indicate that a total organic load equivalent to that from a population of 1,475,000 was discharged to the river from Berlin to a point below the Lewiston-Auburn area. Wastes entering below the Little Androscoggin River confluence have not been included.

A total of 908,500 population equivalents was discharged to the river from the Berlin and Gorham area in New Hampshire. Of the load 891,000 P.E. were discharged by the Brown Company.

In the Mexico-Rumford area a load of 318,000 population equivalents was discharged. Of this 307,000 were discharged by the Oxford Paper Company.

12-a



– SUMMER 1961 DATA –

ANDROSCOGGIN RIVER

NEW HAMPSHIRE – MAINE

CHART 3

At Livermore Falls, 78,000 P.E. were discharged with the International Paper Company contributing 75,400.

The total P.E. discharged in the Lewiston-Auburn area, including the wastes discharged by municipalities and industries on the Little Androscoggin, amounted to 168,000. Industry accounted for 116,800 of this number.

In the reach from Berlin to the point below the confluence with the Little Androscoggin (below Lewiston-Auburn) industry discharged 94 percent of the organic load and municipal sewage accounted for 6 percent.

Of the 1,475,000 population equivalents discharged to the river in the reach from Berlin to below Lewiston-Auburn, 908,500 were discharged in New Hampshire, and 566,500 in Maine. The organic load from industry amounted to 1,390,200 population equivalents, and municipal sewage amounted to 84,700.

EFFECTS OF WASTES ON WATER QUALITY

BIOCHEMICAL OXYGEN DEMAND (B.O.D.)

The desirable limits of Biochemical Oxygen Demand present in the river would be that quantity which would not lower the dissolved oxygen content of the river below 5 mg/l. The 5 mg/l value is used in consideration of the requirements for anadromous fish.

The average load during 1961 in "population equivalents", based on 0.167 pounds of 5-day 20°C B.O.D. per capita, carried by the river at each of the stations is presented in Chart 4. Maximum monthly averages of B.O.D. concentrations at each station during 1961 are presented in Chart 5.

The highest values obtained were at Station 2 (MP-130.4) below Berlin. The average B.O.D. load was 136,000 pounds per day, or 820,000 population equivalents. The average concentration for the summer was 11.2 mg/l, and the highest monthly average 12.7 mg/l.

At Station 3 (MP-119.2) Gilead, the first station below the state line, the average residual B.O.D. was 9.9 mg/l or 122,000 pounds per day. The maximum monthly average was 11.8 mg/l.

Station 4 (MP-109.0) Bethel, had an average concentration for the summer of 7.7 mg/l or 98,000 pounds per day. The maximum monthly B.O.D. concentration was 8.2 mg/l.

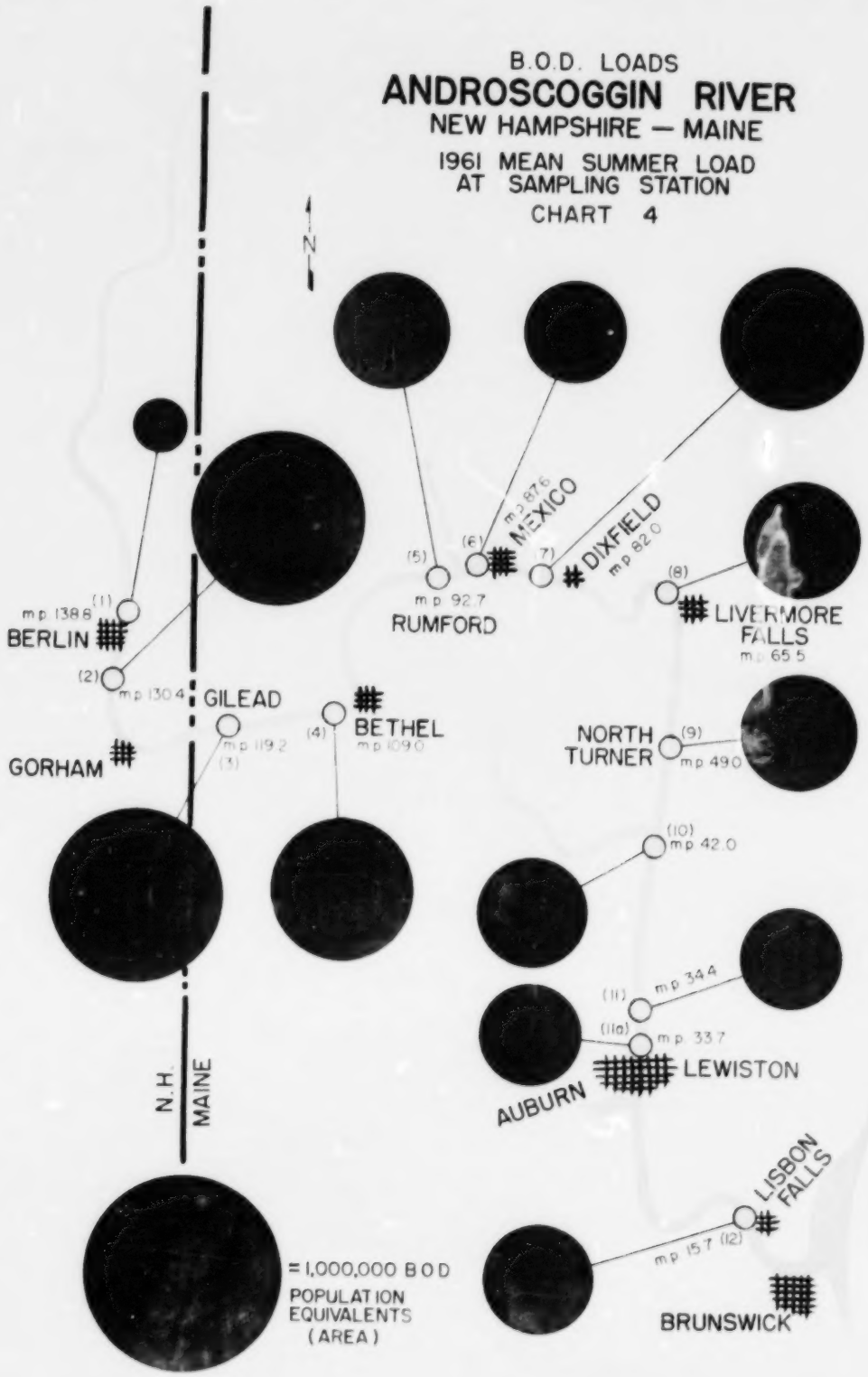
B.O.D. LOADS

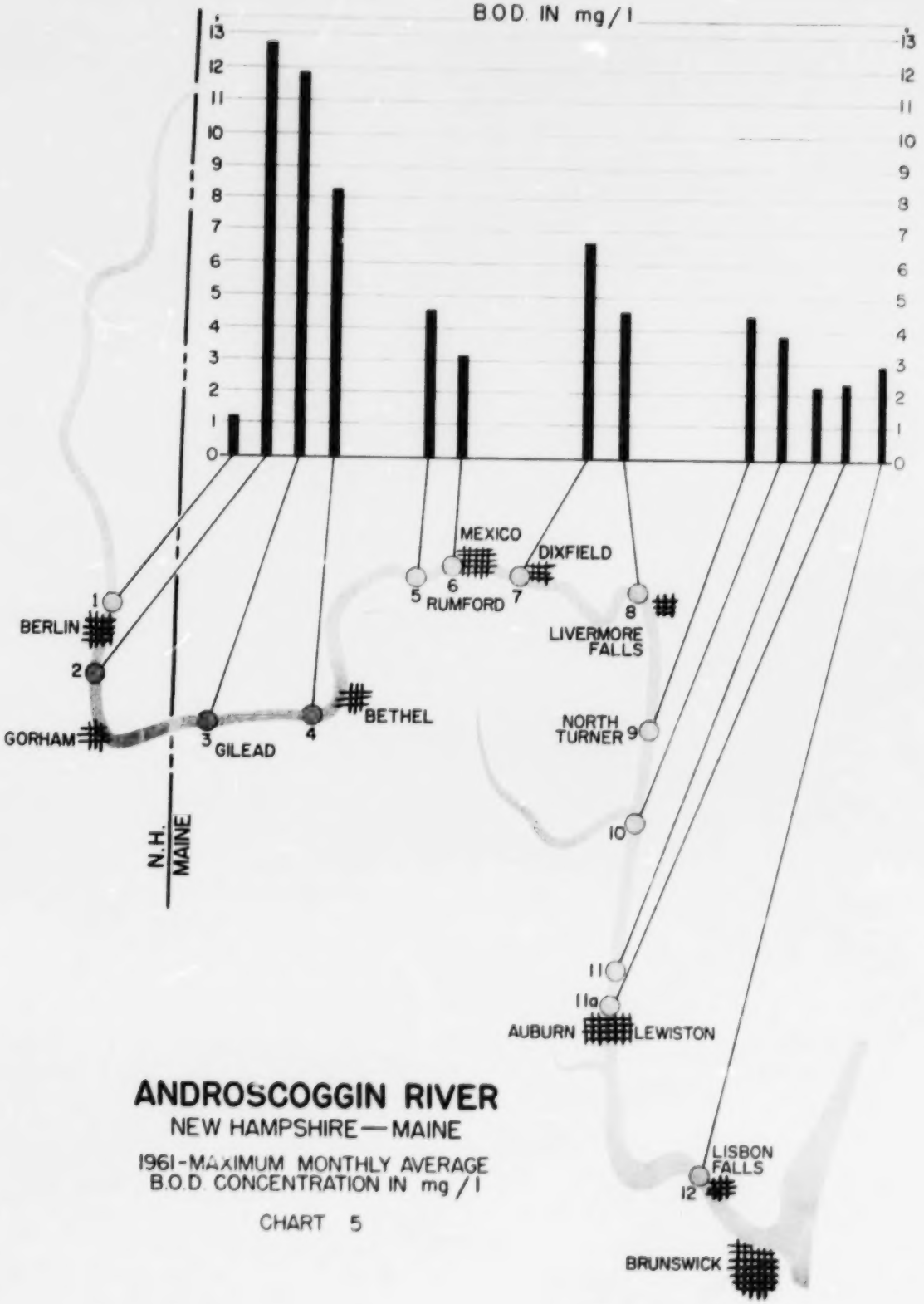
ANDROSCOGGIN RIVER

NEW HAMPSHIRE — MAINE

1961 MEAN SUMMER LOAD
AT SAMPLING STATION

CHART 4





ANDROSCOGGIN RIVER

NEW HAMPSHIRE — MAINE

1961 - MAXIMUM MONTHLY AVERAGE
B.O.D. CONCENTRATION IN mg/l

CHART 5

Maximum monthly B.O.D. averages from below Berlin, R.M. 130.4, to Turner Center, R.M. 42.0, ranged from 3.1 to 12.7 mg/l. Maximum values occurred at the three stations below Berlin and at Dixfield below the Rumford-Mexico area.

Comparison, 1941-1961 B.O.D. Data

Data included in Bulletin No. 1 of the Maine Sanitary Water Board indicate that an industrial waste load of 1,576,000 population equivalents was discharged to the Androscoggin River from the Berlin and Gorham area in 1941. The Brown Company Burgess Mill at Berlin discharged 1,006,000 P.E., and the Brown Company Cascade Mill at Gorham 568,000. In 1961 the mill at Berlin discharged an average load of 891,000 population equivalents. The reduction from 1,576,000 P.E. in 1941 to 891,000 P.E. in 1961 amounted to 43 percent.

In 1941 an industrial waste load of 659,000 population equivalents was discharged to the river in the Rumford area. Data in 1961 indicated an industrial waste load of 307,000 P.E. At Rumford the reduction of population equivalents discharged amounted to 53 percent.

At Livermore Falls the 1941 industrial B.O.D. load was 96,700 population equivalents, and in 1961 was 75,400. This amounted to a reduction of 22 percent.

Total industrial discharges from Berlin, Rumford and Livermore Falls in 1941 equaled the organic load from a population of 2,331,000. In 1961 these industrial discharges amounted to 1,273,400 population equivalents. The reduction of the organic load discharged to the river amounted to 45 percent, as opposed to the more commonly quoted reduction of 95 percent

based on waste sulfite liquor discharges.

DISSOLVED OXYGEN (D.O.)

Dissolved Oxygen concentrations have been of primary concern in the pollution control measures provided along the Androscoggin River. Pollution, specifically from the pulp and paper mills, has been regulated to prevent the complete loss of D.O. in the river.

The absence of dissolved oxygen in the river during the summer months of the early 40's and in later years permitted the development of the obnoxious conditions. During the summers from 1948 through 1960 (with the exception of 1954) sodium nitrate was added to the river to prevent the formation of hydrogen sulfide resulting from complete D.O. depletion. During the summer of 1961 the use of sodium nitrate was discontinued though a supply was maintained by the pulp and paper companies.

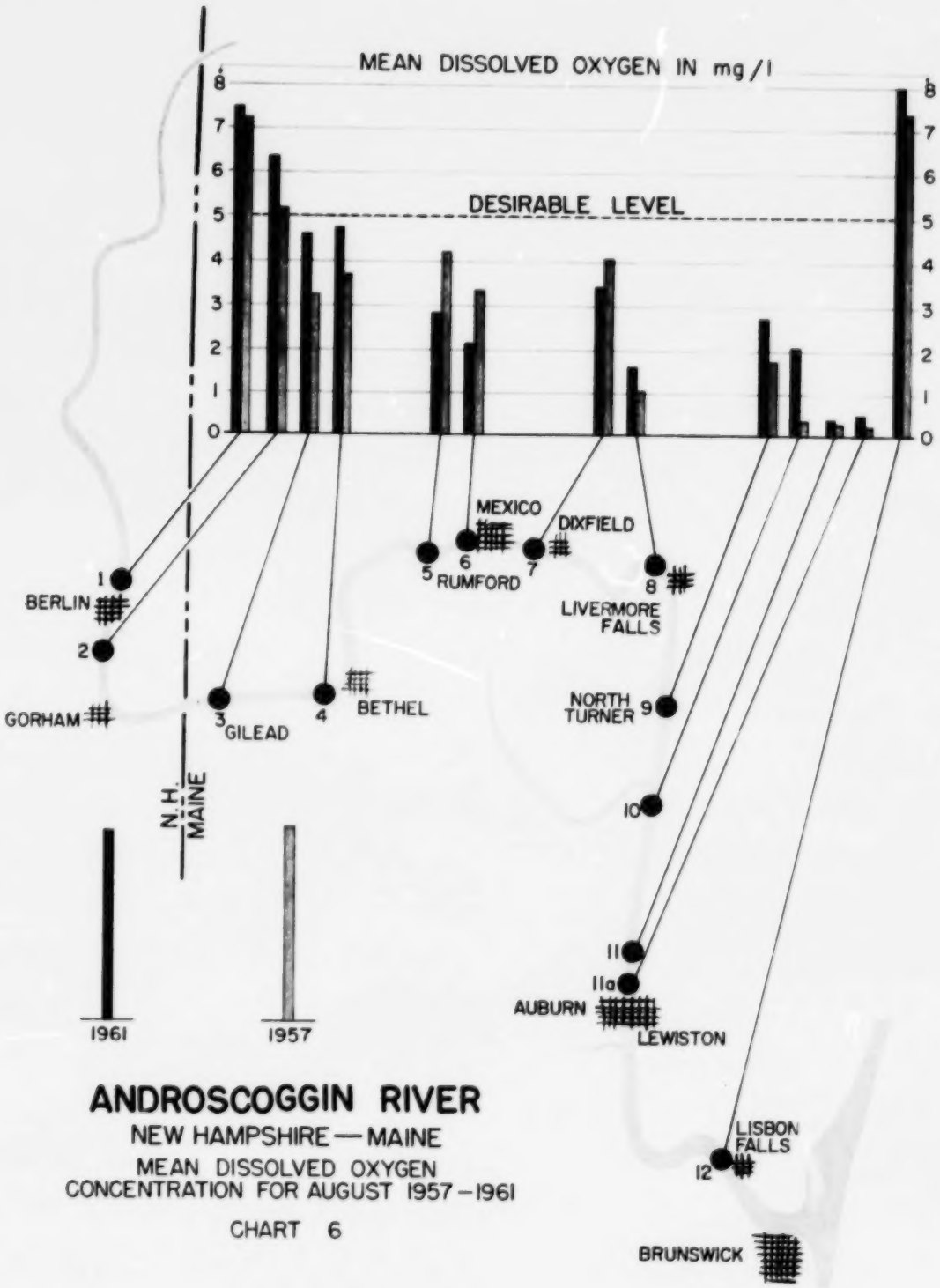
The desirable objective of dissolved oxygen content is 5 mg/l for the propagation of fish life.

Chart 6 presents a comparison of average dissolved oxygen concentrations for August 1957 and August 1961.

Average dissolved oxygen concentrations during August 1961 were below 5 mg/l at Station 3, Gilead, through Lewiston.

At Station 5 (MP-92.7), Rumford Point, 13 of the 18 samples considered in 1961 contained less than 5 mg/l. A minimum value of 1.3 mg/l was recorded during August.

At Station 6 (MP-87.6) Rumford, the D.O. dropped below 1 mg/l in one sample, and 12 of the 18 samples had less than 5 mg/l.



ANDROSCOGGIN RIVER

NEW HAMPSHIRE — MAINE

MEAN DISSOLVED OXYGEN
CONCENTRATION FOR AUGUST 1957 – 1961

CHART 6

In 1930 Professor Charles Walker found the dissolved oxygen content of the river just above Rumford to be 4 ppm. In his report Professor Walker stated that joint action of the States of New Hampshire and Maine would be required should the load of the stream be materially increased. The 1961 data indicate 11 of the 18 samples above Rumford from June through September contained less than 4 mg/l.

The court decree of 1948 required that 4 ppm of dissolved oxygen be maintained at the North Turner Bridge. During the 1961 sampling period the minimum dissolved oxygen at Station 9, North Turner, was 1.83 mg/l. Average values were 2.64 and 3.31 mg/l for August and September respectively. None of the samples during August and September contained as much as 4 mg/l.

Bulletin No. 1, as the result of the 1941 Metcalf & Eddy study, included the following proposal:

> "Taking into consideration the value of the stream for the disposal of wastes and sewage on the one hand, and the hazard to public comfort and health on the other, it is our conclusion that the river should not be so polluted as to constitute a public nuisance, but that it would be impractical <u>at present</u> to reduce the pollution to the extent necessary to make the river below Berlin a stream fit for fishing or other recreational purposes. We propose, therefore, that the criterion for control of pollution be the maintenance, at all times at all points, of dissolved oxygen in the river water in the amount of approximately 2 parts per million."

During the 1961 sampling period, D.O. concentrations of less than 2 mg/l occurred in one or more samples at Stations 5, 6, 8, 9, 10, 11, 11A, and 11B. At Station 11 (Gulf Island Dam) nine consecutive samples during July and August contained less than 1 mg/l of D.O., and from July to late September the D.O. was less than 2.0 mg/l in all weekly samples. D.O. values as low as 0.20 mg/l or 2 percent saturation were recorded.

All samples during July and August at the Deer Rips and Lewiston Canal stations contained less than 2 mg/l and were generally below 1 mg/l.

At Station 12 (MP-15.7) Lisbon Falls, D.O. levels recovered to near saturation values.

Minimum D.O. values obtained during 1961 from Rumford Point (Station 5) downstream through Lewiston (Station 11A) were just barely sufficient to prevent the formation of anaerobic conditions in the river.

Dissolved oxygen used in the stabilization of organic matter is replaced through reaeration. The rate of this oxygen replacement depends on a number of factors, such as the degree of oxygen depletion, temperature, and surface area in contact with the atmosphere. Increased depths, such as those in the Gulf Island Pool, decrease the rate of reaeration of the river water above the Lewiston-Auburn area.

According to the U. S. Fish and Wildlife Service in Boston,[5]

> "The Androscoggin River formerly supported runs of anadromous fish such as Atlantic Salmon, American Shad, alewife, and American Smelt. These species have been eliminated from the river for a long time due to pollution and the construction of dams without fish passage devices. . . .this pollution is largely responsible for the depletion of fishery resources other than the anadromous species.
>
> "The major obstacle to any anadromous fishery restoration program remains the pollution problem."

COLIFORM BACTERIA

Only sewage discharges from municipalities were considered as sources of bacterial contamination. No stream data on bacteriological determinations were available for the preparation of this report. With sewered population figures and stream flows available, coliform bacteria densities in the receiving stream can be estimated with reasonable assurance.

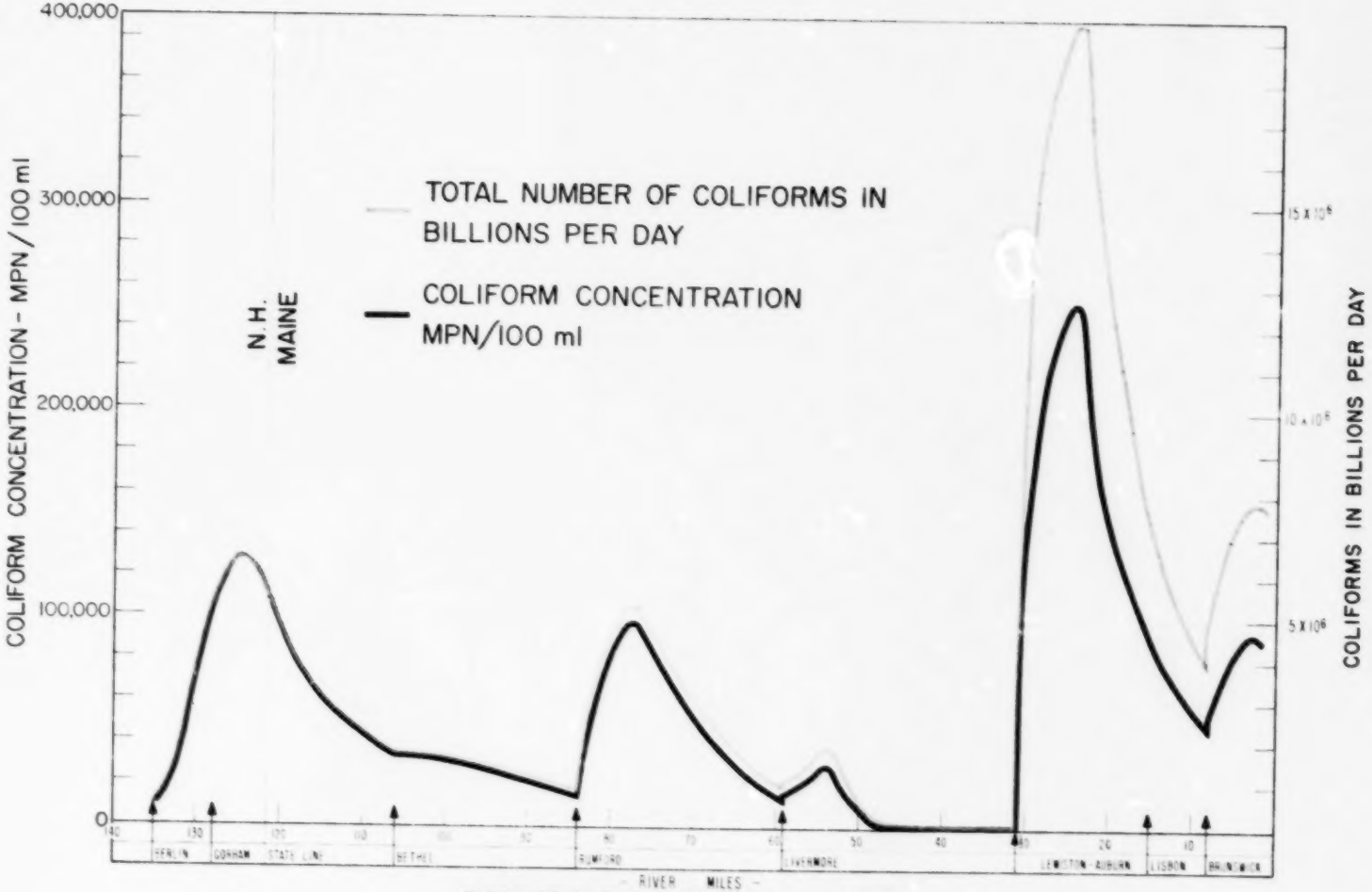
Estimates for the Androscoggin have been based on sewered population figures listed in Table 3, and flow data for August 1959.

Chart 2 depicts the bacterial population equivalents discharged by each of the municipalities. The areas of the circles are in proportion to the quantities discharged by the various sources.

A maximum density of 5,000 coliform bacteria per 100 ml. is generally accepted as satisfactory water to be treated for potable supplies. A limit of 1,000 coliform per 100 ml. is generally accepted in other areas for swimming and other recreational uses requiring contact with the water. Class C of the Maine "Standards of Classification" requires a quality satisfactory for recreational boating, fishing and other uses except potable water supplies and swimming unless adequately treated to meet standards. Class A of these standards is the only class specifically permitting bathing. Class A requires not more than 100 coliform bacteria per 100 ml.

Calculated coliform bacteria densities per 100 ml. and total coliforms per day from above Berlin to the mouth at Merrymeeting Bay are presented in Chart 7. At no point from Berlin to the mouth did the calculated density of coliform bacteria drop below 15,000 per 100 ml. except in the lower portion of the Gulf Island Pool. The calculated coliform densities exceeded 5,000 per 100 ml. by 3 to 50 times.

Below the Berlin-Gorham area the calculated density of coliform bacteria was 130,000 per 100 ml., or about 65 coliforms per drop. A density of 115,000 per 100 ml. was calculated at the state line.



ANDROSCOGGIN RIVER

NEW HAMPSHIRE - MAINE

AUGUST 1959

CHART 7

The peak below the Rumford-Mexico-Dixfield discharges was calculated at 97,100 coliforms per 100 ml.

A maximum density of 253,000 coliform per 100 ml. was calculated at a point approximately 6 miles downstream from the Lewiston-Auburn area. This calculation included the contributions of those municipalities discharging sewage to the Little Androscoggin.

At a point approximately two miles from the mouth of the river a density of 93,100 coliform bacteria per 100 ml. was calculated. The density would be slightly less at the mouth, about 85,000 per 100 ml., as the river discharges to Merrymeeting Bay.

The 101,400 persons discharging sewage to the Androscoggin River from Berlin to Brunswick contribute a total of 40,560,000 billion coliform bacteria to the river each day. New Hampshire communities discharge 7,000,000 billion per day, and Maine communities 33,560,000 billion per day.

The river is not suitable bacteriologically for use as a source of domestic water supply, swimming, general recreation, and certain industrial supplies.

COLOR

Color determinations during the 1961 sampling period indicated a general increase throughout the reach considered. The range was from 37 color units above Berlin to a maximum of 114 units below Rumford. The presence of color detrimentally effects the aesthetic value of the stream.

PHYSICAL OBSERVATIONS

Visual observations were made of the river from above Berlin, New Hampshire, to Rumford, Maine, on April 11, and from Rumford to the Lewiston-Auburn area on April 12, 1962.

Flow during this period was much higher than average.

Odors were present in the vicinity of the pulp and paper plants. A strong odor existed in the Rumford area. It is probable that these odors were from the atmosphere rather than from the river.

Foaming was observed in the rapid areas of the river and below the dams and falls. Below the points of heavy turbulence foam covered a large portion of the river and was observed at points several thousand yards downstream.

The river water appeared quite dark and unattractive from Berlin to Lewiston because of the color.

One sign was observed along the river that read:

"REFLECTION POND"

Water Polluted

Not Fit For
Drinking or
Swimming.

WATER USES

The fall of 1,090 feet in the river from Berlin to Brunswick provides the necessary energy for the hydroelectric plants in the basin. Hydroelectric developments have a capacity of about 150,000 kilowatts, by utilizing approximately 790 feet of the total fall.

The river is used extensively for the disposal of municipal sewage and industrial wastes. No treatment is provided the sewage discharged from the communities in New Hampshire. In Maine, with the exception of a small part of one community, no treatment is provided the municipal sewage discharged to the river. Process changes, chemical recovery, lagooning, controlled discharge, and regulated production are some of the methods used in reducing industrial waste discharges.

Use is made of the river water as an industrial source where a higher quality is not required.

Total industrial and municipal uses in the basin amounted to 171 million gallons per day (mgd) in 1954. Of this amount 159 mgd was used by industry. Pulp and paper mills used 93 percent of the 159 mgd, textiles 3 percent, food processing 1 percent, and other industries 3 percent.[4]

DAMAGES TO WATER USES

The amount of raw sewage and industrial waste discharged to the Androscoggin River from Berlin to Merrymeeting Bay causes sufficient pollution to preclude water uses except those requiring only the low quality available.

At the present time no municipal water supplies are taken directly from the Androscoggin River between Berlin and Merrymeeting Bay. Of the people served by municipal systems along the reach 70 percent utilize surface supplies drawn from tributary streams. The remaining 30 percent obtain their supplies from ground sources or combinations of ground and surface sources.

In 1959 a sampling program in Maine, including the Rumford area, disclosed that 99.2 percent of all samples from drilled wells, and 84 percent of the samples from dug wells contained concentrations of Radon-222 and daughter products exceeding 2,000 micromicrocuries per liter (μμc/l).[6] In addition the average Radium-226 activity found in 33 drilled wells and 19 dug wells was 66 and 73 μμc/l respectively. The Maximum Permissible Concentration (MPC) for Ra-226 in domestic water supplies is 3.3 μμc/l.[7]

The radioactive qualities of ground water in the area limits additional development of this source of water supply.

It has been reported that Rumford and Mexico are seeking replacement or additional water supply. The logical source is the Androscoggin River.

In a letter dated December 13, 1960, addressed to "Hearing Officer, Public Hearing on Androscoggin River Basin, Lewiston, Maine" and signed by the Superintendent, Brunswick-Topsham Water District, and marked Exhibit No. 3 of the hearing December 14, 1960, the following was included:[8]

> "Apart from the health hazard of pollution in general, some of the pollutants of the Androscoggin are of a nature that makes them difficult, if not impossible, to remove by present day water treatment methods. So in spite of the fact that several thousand times the required water supply flows daily by in the Androscoggin River, the Water District has spent in excess of $60,000 in unfruitful exploration of ground water supplies.
>
> "While the water supply of the District is adequate to meet the normal demands of the near future, it would not be adequate to attract a water-using industry, as would be the case if the river water could be used with a filtration plant."

At this same hearing a statement by the Honorable Emile Jacques, Mayor of the City of Lewiston, (marked Exhibit No. 4), included the following:

> "For a long time now, we have been annoyed by a filthy and foul river running between our cities of Lewiston and Auburn. The existence of such conditions as are found in this river has tragic consequences on the social and economic life of the entire area. Pollution, blight and their by-products are barriers to the growth of any community, and the notoriety of the Androscoggin River has damaged the reputation of our city. There is a lack of water for the use of industry in our community. This imperils the operations of our present industries and hampers the expansion we must plan if we are to meet the demands of the future."

Merrymeeting Bay is the junction of the Kennebec, Androscoggin, Cathance, Abagadassett and Eastern Rivers. It is world-famous for its duck hunting and water-fowling. Along the shores of the bay are hundreds of cottages, farms and summer homes where vacationers and duck hunters annually visit for sport and relaxation. Merrymeeting Bay, the tidal reaches of the Androscoggin and Kennebec Rivers, and the outlet of the bay to the ocean have been closed to the harvesting of shellfish because of pollution.

The pollutional and physical blocks in the lower reach of the river prevent the passage of anadromous fish.

The 1954 Androscoggin River Basin Report, prepared by the New England-New York Inter-agency Committee, states that a number of farms in the Basin reported that they were unable to use the stream water for stock watering because of industrial and/or municipal pollution.

Uses prevented, or interfered with by the existing quality include:

1. Development as a public water supply.
2. General recreation.
3. Development as industrial supplies requiring higher quality than that available.
4. Propagation of fish.
5. Passage of anadromous fish.
6. Harvesting of shellfish from the Merrymeeting Bay area.
7. Livestock watering.

SUMMARY AND CONCLUSIONS

An analysis of the existing chemical and physical data on the Androscoggin River obtained from the Offices of the Attorney General of Maine was made with particular consideration of the data for the summer months of 1961. Calculations were made to estimate the bacteriological effects on the river by municipal sewage discharges.

A continuing program to regulate pollution of the Androscoggin has been conducted by the states and industry since 1943. The program has been conducted under a series of decrees by the Supreme Judicial Court of Equity for Androscoggin County. The decrees have required the controlled discharge of sulfite waste liquors, the maintenance of a sampling and analysis program during the summer months by industry, and the construction of certain control facilities. One requirement for satisfactory control was that four parts per million of dissolved oxygen was to be maintained at North Turner, at the head of the pool formed by the Gulf Island Dam. Requirements of the court decrees have been supervised by a court appointed administrator since 1948.

The controls placed on industry have been aimed at the prevention of a public nuisance, while continuing to use the river as a means of disposing of industrial wastes and municipal sewage. The "public nuisance" has been considered only in light of obnoxious odors, floating gas-lifted sludges, corroded metals and discolored paint. Reports indicate that the

controls have succeeded in removing these extremely undesirable results of gross pollution.

Although the condition has been improved since 1940, analysis of the 1961 data indicates the Androscoggin River remains polluted. The pollution assimilation capacity of the river is so utilized that the quality is maintained at a level that will just prevent the development of obnoxious conditions.

The organic load discharged to the river from Berlin, New Hampshire, to a point below the Auburn-Lewiston area during the summer of 1961 was equivalent to that from a population of 1,475,000. Of this load, industrial wastes contributed 94 percent and municipal sewage 6 percent. Wastes having a population equivalent of 908,500 were discharged in New Hampshire.

Dissolved oxygen concentrations from Rumford Point to Lewiston were in general below 5 mg/l, and frequently approached zero from Turner Center through the Lewiston stations.

Calculations of coliform bacteria densities indicate excessively high numbers of sewage bacteria present in the stream below the municipal discharges.

Additional data are needed to evaluate the significant industrial contributions other than the pulp and paper mills. Bacteriological data are needed to ascertain the behavior of the indicator organisms in this specific river. Biological studies are needed to determine the effect of the wastes on the aquatic life.

Pollution of the Androscoggin River was caused during the summer of 1961 by municipal and industrial wastes which:

1. Caused excessively high concentrations of oxygen demanding organic matter.
2. Depleted the dissolved oxygen content of the river to barely trace quantities below Rumford, in the Gulf Island Pool and in the Lewiston-Auburn area. Dissolved oxygen content was depleted below the desirable 5 mg/l from Station 3, Gilead, to below Lewiston and Auburn.
3. Caused excessively high densities of coliform bacteria.
4. Destroyed the aesthetic value of the river from Berlin to the mouth.
5. Prevented development of fishery resources.
6. Caused a pollutional block preventing the passage of anadromous fish.
7. Contributed to the polluted condition of Merrymeeting Bay resulting in the bay being closed to shellfish harvesting.
8. Caused the river to be of such low quality so as to prevent the potential development of municipal and industrial water supplies, and recreational uses.

Pollution of the Androscoggin River at the New Hampshire-Maine state line is evident. Pollution originating in New Hampshire damaged the water quality at the state line, and the residuals of this pollution along with the added wastes in Maine, contributed to the degraded quality to the mouth in Merrymeeting Bay.

Pollution by Berlin and Gorham, and the Brown Paper Company at Berlin, in New Hampshire constitutes interstate pollution, subject to abatement under the Federal Water Pollution Control Act, since the Health and Welfare of persons, in a state other than that in which the pollution originates, is endangered.

REFERENCES

1. Lawrence, Walter A., "A Twenty-Year Review of Androscoggin River Pollution Control Activities." (June 6, 1961).

2. Chase, E. Sherman, Consultant, Metcalf & Eddy, "A Twenty-Year Study of Pollution of the Androscoggin River." (Presented at the American Society of Civil Engineers' October 1960 Meeting in Boston, Massachusetts).

3. Prepared by Metcalf & Eddy, "Investigation of the Pollution of the Androscoggin River and Remedial Measures." Bulletin No. 1, 1942, State of Maine Sanitary Water Board.

4. "The Resources of the New England-New York Region, Part 2, Chapter VII, Androscoggin River Basin, Maine-New Hampshire." New England-New York Inter-Agency Committee. (Revised May 1954, July 1954, October 1954).

5. Letter addressed to Mr. Lester Klashman, U. S. Public Health Service, 42 Broadway, New York 4, N. Y. (Signed by M. A. Marston, Chief, Division of Technical Services, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, 59 Temple Place, Boston, Massachusetts). Dated June 15, 1962.

6. Smith, Benjamin M., et al, "Natural Radioactivity in Ground Water Supplies in Maine and New Hampshire." Journal AWWA, Vol. 53, No. 1. (January 1961).

7. International Commission on Radiological Protection, "Report of Committee II on 'Permissible Dose for Internal Radiation'.", Pergamon Press. (1959).

8. Minutes of Public Hearing on Androscoggin River Basin for Flood Control and Allied Purposes. Before: Brig. General Seymour A. Potter, Jr., Presiding Officer, Berlin, New Hampshire. (December 13-14, 1960).

APPENDIX A

Chemical & Physical Data
Max., Min. & Ave. Values
For months of June, July & Sept.
1957 through 1961

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 1 - River Mile 138.8

YEAR	MO.		FLOW c.f.s	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	1620	23	7.1	8.31	89	71	1.1	10	57	55
		MIN	1562	17	6.5	6.63	79	58	0.8	7	40	40
		AVE	1583	20	6.8	7.39	84	63	1.0	9	50	46
	JUL	MAX	1810	20	6.7	7.65	85	69	1.2	12	69	60
		MIN	1588	18	6.4	7.08	80	64	0.7	6	36	35
		AVE	1668	20	6.5	7.43	83	68	0.9	8	47	45
	AUG	MAX	1865	21	6.9	7.73	86	78	2.0	20	115	60
		MIN	1780	19	6.7	6.71	75	66	0.7	7	41	35
		AVE	1833	20	6.8	7.27	82	72	1.3	13	77	41
	SEP	MAX	1884	19	6.9	8.16	88	83	1.5	15	88	35
		MIN	1806	17	6.7	6.94	76	69	0.7	7	41	35
		AVE	1869	18	6.8	7.42	81	74	1.0	10	57	35
1959	JUN	MAX	6241	20	6.7	9.67	94	326	1.3	38	230	80
		MIN	1712	12	6.6	7.45	85	69	1.0	12	70	40
		AVE	3028	17	6.6	8.28	89	144	1.2	19	113	53
	JUL	MAX	4756	24	6.9	8.26	91	212	1.5	28	170	45
		MIN	1983	18	6.7	6.83	83	73	1.0	12	64	40
		AVE	2544	22	6.8	7.41	87	105	1.2	17	94	41
	AUG	MAX	2144	24	6.8	7.65	89	85	1.5	20	113	40
		MIN	1972	21	6.7	6.83	83	73	0.6	6	38	35
		AVE	2023	22	6.7	7.23	86	79	1.0	12	70	38
	SEP	MAX	2205	23	7.0	8.87	95	94	1.3	13	76	40
		MIN	1884	16	6.7	7.29	87	78	0.6	8	46	40
		AVE	2003	20	6.9	8.08	91	87	1.0	10	61	40
1960	JUN	MAX	2513	20	6.6	8.05	88	173	1.6	21	124	50
		MIN	1791	17	6.2	7.49	85	75	0.9	9	55	40
		AVE	2139	19	6.5	7.80	86	110	1.2	14	85	42
	JUL	MAX	2021	22	6.9	7.80	87	80	0.9	10	58	40
		MIN	1776	19	6.6	7.24	83	75	0.6	6	36	40
		AVE	1930	20	6.8	7.51	85	78	0.7	8	46	40
	AUG	MAX	1990	21	6.7	7.45	86	79	3.7	39	233	40
		MIN	1940	20	6.6	7.24	82	77	0.8	8	46	35
		AVE	1961	20	6.6	7.39	85	78	1.6	17	105	36
	SEP	MAX	2100	21	6.7	8.98	93	94	1.6	18	109	70
		MIN	1846	15	6.6	7.34	85	77	0.6	6	36	35
		AVE	1934	18	6.6	8.22	89	86	1.2	13	79	43
1961	JUN	MAX	3212	21	6.7	10.20	94	145	1.3	19	112	40
		MIN	2004	10	6.6	7.60	88	82	1.0	11	64	35
		AVE	2645	16	6.7	8.62	90	124	1.1	16	92	39
	JUL	MAX	1989	23	6.9	7.91	87	84	1.4	15	87	40
		MIN	1958	18	6.5	6.66	80	72	0.8	8	50	35
		AVE	1969	20	6.7	7.38	84	78	1.0	10	61	37
	AUG	MAX	2127	23	6.8	7.91	87	91	1.3	14	84	40
		MIN	2044	18	6.6	6.99	84	79	0.8	9	52	35
		AVE	2085	20	6.7	7.50	86	84	1.0	11	63	37
	SEP	MAX	2013	21	6.8	8.26	91	88	1.0	11	63	40
		MIN	1978	18	6.6	7.09	82	76	0.6	6	38	35
		AVE	1992	20	6.7	7.60	86	82	0.8	9	51	36

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 2 - River Mile 130.4

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP.	COLOR
1957	JUN	MAX	1888	22	6.7	4.30	50	44	32.6	301	1772	130
		MIN	1682	18	5.7	3.21	36	31	14.8	144	850	120
		AVE	1773	20	6.1	3.71	42	36	22.1	211	1238	126
	JUL	MAX	1996	20	6.5	5.49	60	54	25.1	271	1591	160
		MIN	1628	18	6.1	4.86	54	45	15.6	137	806	110
		AVE	1799	19	6.3	5.25	58	51	19.2	189	1111	125
	AUG	MAX	1872	21	6.6	5.71	62	57	27.3	276	1623	130
		MIN	1796	18	6.3	4.43	52	45	18.9	190	1117	90
		AVE	1846	19	6.5	5.22	58	52	23.8	237	1395	106
	SEP	MAX	1854	19	6.8	6.49	69	65	25.4	253	1487	110
		MIN	1816	16	6.5	5.18	58	52	19.7	197	1160	90
		AVE	1836	18	6.6	5.64	61	56	22.4	222	1304	98
1959	JUN	MAX	7045	21	6.8	10.45	99	398	19.6	373	2240	90
		MIN	1810	12	6.4	4.86	53	49	9.8	161	965	85
		AVE	3345	17	6.5	7.16	75	154	15.3	238	1430	89
	JUL	MAX	4888	25	6.7	8.90	96	235	17.8	199	1190	90
		MIN	2045	18	6.2	5.23	64	58	3.9	45	272	80
		AVE	2656	22	6.4	6.94	79	105	9.8	125	752	88
	AUG	MAX	2173	23	7.0	6.42	73	74	23.6	259	1550	110
		MIN	2014	21	6.5	4.55	54	50	5.1	60	358	80
		AVE	2062	22	6.7	5.71	66	64	13.6	150	896	90
	SEP	MAX	2378	22	6.9	7.19	76	79	23.8	248	1490	75
		MIN	1933	15	6.1	5.28	61	68	3.4	38	231	60
		AVE	2106	19	6.4	6.46	70	72	15.6	176	1050	70
1960	JUN	MAX	3380	20	6.6	8.54	91	148	17.8	278	1668	130
		MIN	1928	17	6.1	5.02	57	52	4.1	53	317	75
		AVE	2517	18	6.3	6.87	75	96	14.0	191	1147	90
	JUL	MAX	2104	22	6.7	7.87	86	83	18.4	202	1212	90
		MIN	1964	18	6.2	4.99	57	57	4.8	51	305	60
		AVE	2054	20	6.5	6.42	73	71	11.3	126	754	80
	AUG	MAX	2036	20	6.6	7.45	83	78	23.2	253	1518	85
		MIN	1940	20	6.2	5.33	61	57	6.2	65	391	70
		AVE	1993	20	6.4	6.21	70	67	13.3	143	861	80
	SEP	MAX	2270	21	7.0	7.87	83	97	14.0	146	876	100
		MIN	1890	15	6.1	5.49	64	58	9.6	100	599	45
		AVE	1996	18	6.6	7.02	76	76	11.3	122	732	74
1961	JUN	MAX	3542	21	6.8	9.63	95	170	13.7	176	1035	85
		MIN	2110	10	6.4	6.09	71	69	5.4	98	573	60
		AVE	2948	16	6.6	8.17	85	133	9.7	148	870	72
	JUL	MAX	2130	23	6.8	8.23	89	91	14.6	164	966	85
		MIN	2044	18	6.2	5.49	64	62	2.8	31	182	55
		AVE	2078	21	6.5	6.44	74	72	10.3	116	682	72
	AUG	MAX	2170	23	6.8	7.04	77	82	16.6	188	1105	95
		MIN	2096	18	6.3	5.64	67	64	10.7	122	720	75
		AVE	2125	21	6.5	6.34	73	73	12.7	146	856	81
	SEP	MAX	2044	21	6.8	6.93	75	75	13.4	146	857	80
		MIN	2012	18	6.5	5.43	63	60	10.8	119	701	55
		AVE	2027	20	6.6	6.34	72	69	12.3	135	793	66

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 3 - River Mile 119.2

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS /DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	1906	22	6.4	4.24	45	41	21.1	203	1197	130
		MIN	1747	17	6.1	0.55	6	5	12.5	128	752	110
		AVE	1834	20	6.2	2.13	23	21	15.5	153	897	120
	JUL	MAX	2056	20	6.5	4.66	52	49	24.7	274	1612	120
		MIN	1644	18	6.2	2.59	28	24	9.6	85	501	100
		AVE	1867	19	6.4	3.47	38	35	14.2	147	864	113
	AUG	MAX	1909	21	6.5	4.24	45	42	22.2	222	1303	130
		MIN	1801	17	6.3	2.07	24	21	16.0	158	926	100
		AVE	1859	19	6.4	3.25	36	33	18.1	181	1066	112
	SEP	MAX	1848	18	6.8	4.61	49	46	20.4	200	1174	110
		MIN	1812	16	6.2	3.62	38	36	12.6	126	739	90
		AVE	1832	17	6.5	4.06	43	40	17.8	176	1035	100
1959	JUN	MAX	7573	21	6.5	9.94	94	406	15.6	397	2333	90
		MIN	1866	17	6.4	3.13	35	32	9.7	141	828	80
		AVE	3522	18	6.8	5.99	62	146	12.6	215	1266	85
	JUL	MAX	4927	25	6.6	9.00	97	239	19.0	213	1252	90
		MIN	2069	19	6.1	3.21	39	36	2.5	48	284	80
		AVE	2696	22	6.4	5.88	67	95	8.2	101	593	87
	AUG	MAX	2250	24	6.7	5.69	65	69	14.1	156	919	90
		MIN	2028	21	6.5	3.21	39	36	3.4	41	244	75
		AVE	2093	22	6.6	4.59	53	52	8.6	95	560	81
	SEP	MAX	3919	22	7.0	6.31	66	102	21.0	269	1581	80
		MIN	1969	14	6.3	4.81	55	58	3.0	38	205	70
		AVE	2520	18	6.5	5.55	60	73	13.6	180	1062	72
1960	JUN	MAX	4023	22	6.5	8.18	84	178	13.3	208	1248	140
		MIN	2017	16	6.1	3.42	39	40	2.1	29	172	70
		AVE	2750	18	6.3	6.15	65	97	9.6	140	837	93
	JUL	MAX	2162	22	6.7	7.14	77	81	14.3	166	995	90
		MIN	2094	18	6.3	4.14	45	48	2.6	29	176	80
		AVE	2130	20	6.5	5.44	60	62	8.6	99	593	86
	AUG	MAX	2087	21	6.6	5.83	65	64	17.1	61	366	90
		MIN	2003	20	6.1	3.35	38	37	4.3	13	80	75
		AVE	2040	20	6.4	4.63	52	51	9.8	35	211	88
	SEP	MAX	2853	22	6.6	8.18	83	126	11.2	120	720	90
		MIN	1920	14	6.3	4.14	48	45	6.5	68	406	60
		AVE	2174	18	6.5	6.20	65	75	8.5	98	590	76
1961	JUN	MAX	3661	22	6.9	10.01	91	177	10.1	146	860	80
		MIN	2164	10	6.3	4.97	57	58	5.1	97	570	60
		AVE	3100	16	6.6	7.71	78	133	7.2	117	688	71
	JUL	MAX	2239	23	6.7	6.93	76	78	19.6	237	1393	110
		MIN	2093	19	6.2	3.21	38	39	3.8	43	253	65
		AVE	2153	21	6.4	4.91	56	57	11.8	139	819	88
	AUG	MAX	2188	23	6.6	6.14	66	73	14.0	161	946	95
		MIN	2129	18	6.2	3.63	43	42	6.5	77	452	75
		AVE	2149	20	6.4	4.56	51	53	9.8	114	670	85
	SEP	MAX	2069	21	6.9	5.52	63	62	12.2	133	784	85
		MIN	2023	19	6.4	4.60	51	50	10.0	112	657	65
		AVE	2048	20	6.7	5.13	57	57	10.9	120	707	74

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 4 - River Mile 109.0

YEAR	MO.		FLOW c.f.s	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	1951	22	6.5	4.24	46	42	21.4	210	1237	120
		MIN	1777	18	6.2	0.62	7	7	11.4	109	643	120
		AVE	1873	20	6.3	2.64	29	25	14.9	151	886	120
	JUL	MAX	2083	20	6.6	4.55	50	47	16.6	187	1098	120
		MIN	1652	18	6.3	3.11	35	28	9.0	82	483	100
		AVE	1899	19	6.5	3.82	43	39	11.9	121	710	108
	AUG	MAX	1931	22	6.6	4.47	47	45	14.8	149	874	120
		MIN	1804	17	6.5	2.59	30	27	13.0	127	745	90
		AVE	1866	19	6.6	3.67	40	37	13.8	139	819	102
	SEP	MAX	1849	18	6.7	4.97	52	49	18.6	184	1083	100
		MIN	1811	15	6.4	3.95	42	39	12.4	122	719	100
		AVE	1830	17	6.6	4.58	48	45	16.5	163	956	100
1959	JUN	MAX	7892	21	6.9	9.63	91	410	16.0	251	1510	100
		MIN	1900	12	6.4	4.39	50	45	5.9	95	575	60
		AVE	3630	18	6.6	6.30	66	151	10.6	171	1020	83
	JUL	MAX	4949	25	6.8	8.54	92	228	13.1	147	882	95
		MIN	2079	18	6.3	3.31	40	37	1.7	45	272	80
		AVE	2720	22	6.6	5.89	76	95	6.2	75	455	85
	AUG	MAX	2312	23	6.7	6.68	76	82	13.1	144	864	80
		MIN	2034	21	6.4	3.83	45	42	1.1	14	85	80
		AVE	2112	22	6.6	5.40	62	62	6.9	76	461	80
	SEP	MAX	4255	23	7.0	6.83	68	130	16.5	200	1200	85
		MIN	1991	14	6.3	5.49	64	65	2.3	27	162	70
		AVE	2621	19	6.6	6.02	65	84	11.0	146	859	78
1960	JUN	MAX	4317	22	6.5	8.23	83	192	12.5	172	1032	140
		MIN	2057	16	6.3	3.47	40	42	1.2	12	74	65
		AVE	2857	18	6.4	6.45	68	105	8.2	74	441	91
	JUL	MAX	2188	22	6.8	7.45	80	86	17.5	205	1230	100
		MIN	2154	18	6.6	4.61	52	54	2.5	29	174	80
		AVE	2165	16	6.6	5.95	66	69	8.1	95	568	88
	AUG	MAX	2110	21	6.7	6.60	73	73	14.2	158	948	95
		MIN	2015	19	6.4	4.24	48	47	2.9	32	193	75
		AVE	2057	20	6.5	5.42	61	60	8.3	92	550	86
	SEP	MAX	2980	21	6.7	8.28	84	200	7.8	198	1188	85
		MIN	1927	15	6.5	5.18	59	59	1.9	73	440	50
		AVE	2217	18	6.6	7.19	77	112	4.8	107	641	73
1961	JUN	MAX	3716	22	6.8	9.96	91	182	9.5	144	850	85
		MIN	2189	10	6.5	5.69	65	67	5.2	95	559	60
		AVE	3170	20	6.6	7.78	80	137	6.9	115	674	70
	JUL	MAX	2288	24	6.8	7.47	83	85	10.1	125	734	95
		MIN	2115	20	6.3	4.45	54	55	2.4	27	161	60
		AVE	2188	22	6.5	5.73	66	67	8.0	95	557	81
	AUG	MAX	2196	24	6.6	5.83	63	69	12.1	140	824	85
		MIN	2133	18	6.2	3.93	44	46	5.9	69	408	75
		AVE	2160	21	6.4	4.76	54	56	7.8	90	531	81
	SEP	MAX	2084	21	6.7	5.61	62	63	12.0	133	780	85
		MIN	2028	18	6.5	4.24	47	46	3.6	40	237	65
		AVE	2058	20	6.6	5.00	55	56	8.2	92	538	72

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 5 - River Mile 92.7

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	2240	22	6.5	3.45	36	38	20.8	220	1291	150
		MIN	1955	17	6.1	2.10	24	25	13.6	165	967	140
		AVE	2109	19	6.3	2.80	31	32	16.7	189	1115	145
	JUL	MAX	2303	20	6.9	4.92	55	60	10.0	121	713	140
		MIN	1696	18	6.6	2.90	31	36	6.1	56	328	80
		AVE	2087	19	6.6	3.85	42	43	7.9	91	535	105
	AUG	MAX	2060	21	6.9	4.73	51	47	7.8	87	510	100
		MIN	1819	17	6.5	3.20	36	36	5.2	53	312	60
		AVE	1901	19	6.6	4.18	45	43	6.2	64	374	80
	SEP	MAX	1859	19	7.0	5.35	59	54	5.8	56	330	110
		MIN	1793	15	6.7	4.45	45	43	5.0	50	295	75
		AVE	1818	17	6.8	4.96	52	49	5.5	54	316	88
1959	JUN	MAX	9793	20	6.8	8.30	78	439	7.8	185	1089	110
		MIN	2087	12	6.5	3.75	42	43	3.5	65	382	85
		AVE	4270	17	6.6	5.51	57	157	5.9	114	671	79
	JUL	MAX	5089	26	6.7	6.85	75	188	7.5	85	499	130
		MIN	2098	19	6.5	2.45	30	28	2.1	29	170	70
		AVE	2866	22	6.6	4.93	56	83	4.2	58	341	95
	AUG	MAX	2624	23	6.8	6.10	70	87	5.5	63	372	100
		MIN	2049	21	6.4	2.75	32	32	2.3	26	153	80
		AVE	2223	22	6.6	4.73	54	58	3.7	43	256	89
	SEP	MAX	6254	23	6.5	6.00	69	210	10.4	122	716	85
		MIN	2087	13	6.3	5.20	55	59	2.4	26	155	70
		AVE	3225	18	6.4	5.83	63	104	6.4	93	548	75
1960	JUN	MAX	6074	22	6.9	7.30	77	233	6.1	194	1164	100
		MIN	2300	14	6.5	4.10	47	56	2.1	72	196	60
		AVE	3493	18	6.7	6.00	63	119	4.9	91	547	75
	JUL	MAX	2510	22	6.9	7.20	76	98	7.0	90	538	90
		MIN	2271	17	6.7	3.45	40	42	2.0	27	163	75
		AVE	2373	20	6.8	5.19	58	67	4.3	55	330	84
	AUG	MAX	2249	21	6.9	6.30	68	74	6.2	70	421	85
		MIN	2084	18	6.6	3.40	37	38	1.9	23	178	70
		AVE	2155	20	6.8	4.92	54	57	4.1	47	287	81
	SEP	MAX	3737	22	7.0	7.10	75	140	4.7	54	327	80
		MIN	1967	14	6.5	4.35	49	48	2.1	22	139	50
		AVE	2469	17	6.7	6.36	66	86	3.4	44	268	68
1961	JUN	MAX	4648	20	6.8	8.50	77	192	6.8	114	668	85
		MIN	2385	10	6.3	4.80	53	62	2.7	68	398	65
		AVE	3709	16	6.6	6.71	68	139	4.5	84	492	71
	JUL	MAX	2585	22	6.8	6.50	70	79	5.6	73	427	110
		MIN	2235	18	6.5	2.93	34	41	2.0	24	143	60
		AVE	2368	21	6.6	4.24	48	53	4.4	56	332	94
	AUG	MAX	2263	23	6.8	3.90	43	47	5.8	70	411	110
		MIN	2158	18	6.4	1.30	15	15	3.5	42	248	75
		AVE	2227	20	6.6	2.76	30	33	4.5	54	316	92
	SEP	MAX	2173	22	6.8	4.80	55	55	3.9	44	261	80
		MIN	2058	18	6.5	2.80	31	31	1.6	18	108	70
		AVE	2118	20	6.7	3.74	42	43	3.1	36	210	71

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 6 - River Mile 87.6

YEAR	MO.		FLOW cfs	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS/DAY	B.O.D. mg/l	B.O.D. 1000 LBS/DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	2260	24	6.6	2.35	25	26	16.6	198	1166	150
		MIN	1970	18	6.2	0.80	9	10	10.6	117	687	140
		AVE	2128	21	6.3	1.33	15	15	14.4	166	974	145
	JUL	MAX	2330	21	7.1	4.75	53	58	9.4	118	695	140
		MIN	1700	18	6.4	2.85	31	30	3.1	35	209	70
		AVE	2103	20	6.7	3.55	40	41	5.7	70	411	100
	AUG	MAX	2070	22	6.9	3.95	45	44	3.1	31	185	75
		MIN	1820	18	6.4	2.68	30	26	2.5	25	144	70
		AVE	1904	20	6.6	3.30	37	34	3.8	28	167	71
	SEP	MAX	1860	20	6.8	4.30	46	42	3.9	38	225	90
		MIN	1790	15	6.6	2.88	31	28	2.4	24	142	65
		AVE	1818	18	6.7	3.68	39	36	3.4	33	193	79
1959	JUN	MAX	9950	21	7.0	8.00	75	430	6.9	167	980	120
		MIN	2100	12	6.5	3.15	36	36	3.1	76	447	85
		AVE	4323	17	6.7	4.94	51	148	5.5	103	607	98
	JUL	MAX	5100	26	6.7	6.68	73	184	6.6	78	457	130
		MIN	2100	19	6.5	0.65	8	7	2.0	28	164	70
		AVE	2878	23	6.6	3.84	43	70	3.9	55	324	95
	AUG	MAX	2650	24	6.8	5.85	67	84	5.9	68	401	110
		MIN	2050	21	6.4	0.95	11	11	1.7	24	143	85
		AVE	2232	22	6.6	3.44	39	43	3.5	41	239	95
	SEP	MAX	6420	23	6.5	4.60	53	159	9.2	107	632	85
		MIN	2090	14	6.2	3.50	37	40	2.1	28	164	75
		AVE	3275	19	6.4	4.21	46	77	5.4	81	475	80
1960	JUN	MAX	6220	23	6.9	7.35	74	262	6.5	81	488	100
		MIN	2320	16	6.5	3.60	40	45	1.4	19	116	60
		AVE	3546	18	6.7	5.94	63	124	2.8	48	291	77
	JUL	MAX	2540	23	6.9	6.65	70	91	4.7	58	347	100
		MIN	2280	18	6.6	2.25	26	28	1.9	24	145	80
		AVE	2390	20	6.8	4.80	53	63	2.7	35	208	89
	AUG	MAX	2260	22	6.9	5.78	63	67	4.8	54	325	90
		MIN	2090	20	6.8	2.28	25	26	1.5	18	106	75
		AVE	2163	20	6.9	4.57	51	38	2.6	30	181	84
	SEP	MAX	3800	22	6.9	6.95	71	142	4.3	51	308	90
		MIN	1970	14	6.3	2.73	31	30	1.6	17	102	60
		AVE	2490	18	6.7	5.42	57	76	3.1	41	247	75
1961	JUN	MAX	4700	21	6.6	8.50	75	190	3.4	76	446	90
		MIN	2400	11	6.3	3.80	43	49	2.8	44	259	60
		AVE	3746	17	6.5	6.03	62	128	3.1	62	367	73
	JUL	MAX	2610	22	6.7	5.70	63	70	3.8	54	315	110
		MIN	2260	19	6.4	2.73	31	36	2.0	25	149	65
		AVE	2410	21	6.6	4.15	47	53	3.0	39	229	88
	AUG	MAX	2270	24	6.7	3.55	39	43	4.7	57	334	110
		MIN	2160	20	6.4	0.75	9	9	2.0	24	143	80
		AVE	2232	21	6.5	2.04	23	25	3.0	37	216	93
	SEP	MAX	2180	23	6.8	4.00	47	46	3.8	43	255	90
		MIN	2060	19	6.6	2.00	23	22	1.1	13	75	70
		AVE	2123	21	6.7	3.04	34	35	2.5	29	170	81

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 7 - River Mile 82.0

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	2422	25	6.6	3.30	36	42	18.8	214	1260	150
		MIN	2111	20	6.3	2.50	29	29	14.8	178	1048	140
		AVE	2283	22	6.4	2.91	33	36	16.2	198	1166	148
	JUL	MAX	2497	22	7.0	5.55	64	73	14.4	177	1039	140
		MIN	1822	21	6.5	3.30	37	35	8.0	79	463	80
		AVE	2253	22	6.8	4.11	47	50	10.9	134	791	110
	AUG	MAX	2236	23	7.0	4.52	53	55	13.8	150	883	90
		MIN	1951	20	6.6	3.70	43	37	8.6	91	533	70
		AVE	2044	22	6.8	4.02	46	44	12.1	134	786	80
	SEP	MAX	1994	21	7.1	5.20	56	55	17.2	178	1048	100
		MIN	1919	16	6.7	3.95	44	42	9.2	97	570	90
		AVE	1948	19	6.9	4.59	50	48	12.1	127	747	94
1959	JUN	MAX	10662	20	7.0	10.50	98	605	23.8	294	1727	110
		MIN	2240	12	6.6	3.40	37	41	5.1	148	869	85
		AVE	4626	17	6.8	6.52	66	209	12.7	226	1332	99
	JUL	MAX	5466	26	7.2	8.48	92	250	14.5	186	1094	150
		MIN	2240	19	6.6	2.10	25	26	6.3	94	553	75
		AVE	3078	22	6.9	4.87	55	94	10.2	155	910	109
	AUG	MAX	2957	24	7.0	5.98	67	92	17.4	210	1238	130
		MIN	2240	21	6.6	2.30	27	28	8.9	137	804	90
		AVE	2582	22	6.9	4.11	47	58	13.0	177	1042	110
	SEP	MAX	6877	23	6.8	7.00	79	260	22.8	338	1988	110
		MIN	2240	14	6.6	4.25	44	51	9.1	176	1033	95
		AVE	3511	19	6.7	5.23	57	110	15.7	254	1496	99
1960	JUN	MAX	6675	23	7.2	8.50	85	703	12.9	277	1662	120
		MIN	2486	16	6.9	4.20	46	118	4.9	105	630	65
		AVE	3709	18	7.0	6.55	69	374	9.3	177	1060	87
	JUL	MAX	2733	24	6.9	6.93	74	103	11.9	157	942	110
		MIN	2442	18	6.5	3.28	35	43	6.9	94	567	90
		AVE	2565	20	6.8	5.30	58	74	9.4	126	759	98
	AUG	MAX	2419	21	6.9	5.75	61	72	12.0	144	864	100
		MIN	2240	20	6.6	3.25	35	39	7.5	15	88	80
		AVE	2313	20	6.8	4.90	55	62	10.1	92	552	91
	SEP	MAX	4077	22	6.9	9.30	93	205	19.9	227	1362	100
		MIN	2106	15	6.4	5.33	61	64	5.3	117	702	80
		AVE	2670	18	6.6	7.08	74	107	13.2	175	1050	89
1961	JUN	MAX	5040	20	6.6	9.80	89	239	8.6	135	793	95
		MIN	2576	11	6.5	4.65	51	65	3.2	75	444	70
		AVE	4019	16	6.5	7.34	74	167	5.3	106	626	82
	JUL	MAX	2800	22	7.1	7.00	76	91	7.2	98	574	120
		MIN	2419	19	6.6	4.03	46	57	4.8	73	427	85
		AVE	2582	21	6.8	5.49	62	76	5.8	81	474	101
	AUG	MAX	2442	24	6.8	4.50	49	58	8.0	105	614	120
		MIN	2307	20	6.4	2.40	28	30	5.8	75	441	100
		AVE	2392	21	6.6	3.39	38	44	6.6	85	500	114
	SEP	MAX	2330	24	6.9	4.50	53	56	6.7	82	481	120
		MIN	2218	18	6.6	3.30	38	40	5.0	62	363	90
		AVE	2274	21	6.7	4.10	46	50	5.8	72	420	108

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 8 - River Mile 65.5

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS/DAY	B.O.D. mg/l	B.O.D. 1000 LBS/DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	2465	25	6.5	1.55	16	19	17.5	206	1209	160
		MIN	2149	18	6.4	0.30	4	4	11.8	157	924	140
		AVE	2324	21	6.4	0.73	8	9	14.7	182	1069	148
	JUL	MAX	2542	21	6.8	3.05	34	41	8.8	117	689	150
		MIN	1855	18	6.4	0.20	2	2	4.7	47	277	90
		AVE	2294	20	6.7	1.27	14	17	7.0	89	521	110
	AUG	MAX	2258	22	6.9	3.83	44	47	9.9	112	659	90
		MIN	1985	18	6.6	0.10	1	1	5.4	66	387	60
		AVE	2077	20	6.7	1.01	12	12	8.1	90	532	72
	SEP	MAX	2029	19	6.9	0.45	5	5	11.3	119	701	120
		MIN	1953	15	6.6	0.15	2	2	9.0	95	561	110
		AVE	1983	17	6.7	0.31	3	3	9.9	105	616	112
1959	JUN	MAX	10800	20	7.0	9.65	90	563	11.5	210	1235	100
		MIN	2280	12	6.8	1.95	21	24	3.6	109	643	85
		AVE	4700	17	6.9	5.16	52	184	7.7	148	868	93
	JUL	MAX	5620	26	6.9	6.55	72	199	10.8	139	816	140
		MIN	2280	20	6.7	0.20	2	2	3.4	78	460	70
		AVE	3156	23	6.8	2.87	32	63	6.6	100	589	104
	AUG	MAX	3020	25	6.9	4.43	50	70	8.5	105	616	120
		MIN	2280	21	6.6	0.35	4	4	3.8	58	342	85
		AVE	2635	22	6.8	1.71	19	26	5.8	80	471	106
	SEP	MAX	6880	23	6.6	4.60	53	171	13.8	265	1561	110
		MIN	3500	14	6.4	1.30	15	28	4.7	143	841	90
		AVE	4472	19	6.5	3.13	34	81	9.4	204	1199	96
1960	JUN	MAX	6818	23	7.0	7.00	71	212	8.0	246	696	100
		MIN	2540	16	6.9	3.65	42	52	3.3	75	147	60
		AVE	3880	19	6.9	5.15	55	114	5.9	127	481	78
	JUL	MAX	2791	24	6.8	5.65	61	85	6.7	92	555	110
		MIN	2494	19	6.7	1.08	12	15	3.5	51	305	80
		AVE	2620	21	6.8	3.18	35	46	5.2	75	451	91
	AUG	MAX	2471	22	6.7	2.43	27	32	6.2	79	472	100
		MIN	2288	20	6.6	0.98	11	12	3.7	49	293	80
		AVE	2363	21	6.7	1.85	21	24	4.6	60	362	89
	SEP	MAX	4164	22	7.0	8.28	83	186	10.0	150	900	110
		MIN	2151	15	6.4	1.05	12	13	3.7	55	328	80
		AVE	2727	18	6.7	4.55	46	75	6.5	95	569	90
1961	JUN	MAX	5148	21	6.5	8.68	81	214	6.8	109	643	95
		MIN	2631	12	6.4	3.95	44	56	3.0	72	425	65
		AVE	4105	17	6.5	6.34	65	147	4.5	93	545	76
	JUL	MAX	2860	23	7.0	5.75	63	77	5.0	72	421	110
		MIN	2471	20	6.6	3.05	35	44	4.1	56	330	80
		AVE	2637	22	6.8	4.41	50	62	4.4	62	366	94
	AUG	MAX	2494	24	7.1	2.23	25	28	6.3	83	490	120
		MIN	2357	21	6.4	0.45	5	6	3.4	45	264	100
		AVE	2444	22	6.9	1.49	17	20	4.5	60	330	112
	SEP	MAX	2380	24	6.7	2.65	30	34	4.5	56	330	110
		MIN	2265	18	6.5	0.90	10	11	1.9	24	141	90
		AVE	2322	21	6.6	1.93	22	24	3.2	40	233	100

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 9 - River Mile 49.0

YEAR	MO.		FLOW c.f.s	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS/DAY	B.O.D. mg/l	B.O.D. 1000 LBS/DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	2512	24	6.4	1.90	20	23	17.6	208	1223	150
		MIN	2190	18	6.3	0.55	6	7	12.7	155	914	130
		AVE	2368	21	6.3	0.99	11	12	15.0	191	1121	150
	JUL	MAX	2590	22	6.9	2.80	31	39	9.9	138	814	150
		MIN	1890	20	6.5	1.05	12	10	4.2	43	252	90
		AVE	2337	21	6.7	2.06	23	27	7.8	102	599	105
	AUG	MAX	2301	22	6.9	2.75	32	34	5.4	67	395	90
		MIN	2023	18	6.4	0.65	7	7	3.8	42	245	60
		AVE	2116	20	6.6	1.67	19	19	4.6	53	312	70
	SEP	MAX	2067	19	6.8	2.02	22	23	6.2	67	393	110
		MIN	1990	17	6.6	0.80	8	9	4.3	47	276	100
		AVE	2020	18	6.7	1.36	15	15	5.3	58	338	102
1959	JUN	MAX	11057	20	6.9	9.55	89	142	7.9	116	682	110
		MIN	2323	12	6.8	2.85	31	36	5.0	28	168	80
		AVE	4797	17	6.8	5.90	60	69	6.4	82	483	195
	JUL	MAX	5688	26	6.9	7.95	86	243	5.7	104	612	120
		MIN	2323	19	6.7	1.45	17	18	3.4	61	372	75
		AVE	3192	23	6.8	4.12	47	85	4.5	73	431	99
	AUG	MAX	3086	24	6.9	5.85	67	93	5.2	65	384	120
		MIN	2323	21	6.7	1.20	14	15	3.5	49	286	85
		AVE	2677	22	6.8	3.06	35	46	4.0	57	337	106
	SEP	MAX	7000	23	6.6	4.60	53	173	13.8	177	1044	110
		MIN	2280	14	6.4	1.30	15	18	4.7	97	572	90
		AVE	3574	19	6.5	3.13	34	68	9.4	149	881	96
1960	JUN	MAX	6923	22	6.9	7.35	77	219	9.5	217	1302	100
		MIN	2579	18	6.7	4.65	51	65	3.9	78	468	60
		AVE	3940	20	6.8	5.73	62	125	6.3	129	775	81
	JUL	MAX	2834	24	6.8	7.35	80	112	7.2	99	592	110
		MIN	2532	20	6.5	2.43	12	33	3.2	49	294	90
		AVE	2660	22	6.7	3.98	44	63	4.7	69	413	99
	AUG	MAX	2509	22	6.8	4.80	54	65	4.3	54	323	90
		MIN	2323	20	6.7	2.95	33	36	2.6	34	203	85
		AVE	2399	21	6.8	4.10	46	53	3.2	42	250	88
	SEP	MAX	4228	22	6.8	8.78	88	200	9.4	139	834	100
		MIN	2184	15	6.4	2.85	33	35	3.4	42	253	80
		AVE	2769	18	6.6	5.40	56	88	5.4	78	470	87
1961	JUN	MAX	5227	21	6.6	9.33	87	235	6.0	113	665	90
		MIN	2571	12	6.3	4.00	45	58	3.2	79	467	65
		AVE	4167	18	6.5	6.75	70	180	4.4	94	550	74
	JUL	MAX	2904	24	7.0	6.03	66	82	4.9	72	424	110
		MIN	2509	20	6.7	4.10	47	60	3.2	45	264	80
		AVE	2678	22	6.8	5.14	59	74	4.1	60	353	90
	AUG	MAX	2532	24	6.8	3.00	34	40	4.2	56	332	110
		MIN	2393	21	6.5	1.83	22	24	3.1	42	249	100
		AVE	2481	22	6.6	2.64	30	35	3.7	50	291	106
	SEP	MAX	2416	23	6.8	3.83	43	50	4.3	54	320	110
		MIN	2300	19	6.6	2.30	26	29	2.3	29	173	90
		AVE	2358	21	6.7	3.31	37	42	3.4	43	253	102

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 10 - River Mile 42.0

YEAR	MO.		FLOW c.f.s	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS /DAY	B.O.D. mg/l	B.O.D. 1000 LBS /DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	2543	26	6.3	2.10	23	26	16.4	216	1271	150
		MIN	2217	19	6.2	0.20	2	3	10.4	129	758	140
		AVE	2397	22	6.2	0.73	8	9	14.1	183	1076	143
	JUL	MAX	2622	22	6.8	1.25	14	18	8.7	123	724	140
		MIN	1913	20	6.4	0.15	2	2	3.0	31	182	70
		AVE	2366	22	6.6	0.74	9	10	6.2	82	484	100
	AUG	MAX	2329	22	6.8	0.58	7	7	8.1	93	544	100
		MIN	2048	21	6.4	0.10	1	1	2.4	42	165	70
		AVE	2143	22	6.6	0.32	4	4	4.8	54	321	78
	SEP	MAX	2093	20	6.8	1.61	18	18	5.7	62	365	120
		MIN	2015	18	6.6	0.20	2	2	3.6	41	239	95
		AVE	2046	20	6.7	0.57	6	6	4.7	52	306	106
1959	JUN	MAX	11200	21	6.9	9.15	88	553	5.1	272	1601	100
		MIN	2355	13	6.6	2.55	29	32	4.0	51	299	75
		AVE	4865	18	6.8	5.64	59	192	4.6	120	708	89
	JUL	MAX	5740	27	6.8	6.90	76	214	3.9	99	583	110
		MIN	2355	20	6.7	0.50	6	6	2.4	32	187	80
		AVE	3233	24	6.7	2.94	33	66	3.0	54	315	96
	AUG	MAX	3110	25	6.9	4.60	53	74	3.8	57	336	120
		MIN	2355	22	6.7	0.30	4	4	2.4	31	185	90
		AVE	2720	23	6.8	1.66	20	26	3.1	45	263	105
	SEP	MAX	7230	23	6.5	4.15	48	162	9.3	129	2105	100
		MIN	2355	15	6.4	3.05	35	46	2.5	38	305	85
		AVE	3691	20	6.5	3.69	40	76	4.8	84	966	93
1960	JUN	MAX	7009	22	6.8	6.75	72	183	5.7	215	1290	100
		MIN	2611	18	6.6	4.00	45	56	2.3	35	425	60
		AVE	3986	20	6.7	5.27	58	114	4.6	97	581	80
	JUL	MAX	2869	23	6.9	6.30	69	98	5.2	72	431	120
		MIN	2564	20	6.7	2.25	26	31	2.8	41	244	85
		AVE	2693	22	6.8	3.52	40	52	3.6	52	311	99
	AUG	MAX	2540	23	6.8	4.63	52	63	5.1	65	389	110
		MIN	2352	22	6.7	2.05	24	26	2.6	36	214	90
		AVE	2429	22	6.8	4.90	34	40	3.5	45	269	95
	SEP	MAX	4281	23	6.8	8.60	86	197	7.0	109	654	110
		MIN	2211	16	6.3	1.40	16	18	2.8	63	378	85
		AVE	2804	19	6.6	4.46	46	77	5.4	78	465	96
1961	JUN	MAX	5292	21	6.6	8.95	87	231	5.5	115	674	85
		MIN	2705	14	6.3	4.20	47	61	2.7	61	361	60
		AVE	4219	18	6.5	6.35	67	152	3.8	83	488	71
	JUL	MAX	2940	26	7.0	5.15	58	71	4.3	63	372	130
		MIN	2540	21	6.6	2.00	24	32	3.1	44	259	100
		AVE	2710	23	6.8	3.67	42	53	3.6	53	313	110
	AUG	MAX	2564	25	6.5	2.63	30	36	4.0	54	320	120
		MIN	2422	22	6.4	0.65	8	9	2.7	37	220	100
		AVE	2512	23	6.5	1.99	23	27	3.2	43	255	110
	SEP	MAX	2446	24	6.8	4.00	47	52	3.0	40	233	110
		MIN	2328	19	6.7	2.55	29	34	2.0	26	152	100
		AVE	2387	22	6.8	3.32	38	43	2.7	31	182	105

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 11 - River Mile 34.4

YEAR	MO.		FLOW c.f.s	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	3954	24	6.2	0.15	2	3	17.4	291	1712	150
		MIN	2993	18	6.1	0.05	1	1	4.9	105	615	140
		AVE	3443	22	6.2	0.10	1	2	12.9	230	1353	143
	JUL	MAX	3696	23	6.8	0.45	5	8	7.0	118	692	150
		MIN	594	21	6.6	0.05	1	1	4.9	22	132	60
		AVE	2660	22	6.7	0.26	3	6	5.9	74	437	105
	AUG	MAX	3708	23	6.8	0.33	4	7	4.0	76	447	80
		MIN	2663	21	6.4	0.10	1	2	2.2	32	186	65
		AVE	3239	22	6.6	0.24	3	4	3.2	57	336	71
	SEP	MAX	3241	20	6.7	0.28	3	5	4.2	74	432	105
		MIN	2575	19	6.6	0.15	2	2	2.8	39	229	90
		AVE	2902	20	6.6	0.23	3	4	3.5	56	327	95
1959	JUN	MAX	10885	21	6.8	6.50	68	297	9.8	270	1590	110
		MIN	3620	14	6.7	0.20	2	4	2.5	83	489	70
		AVE	6179	19	6.7	3.00	31	131	6.2	178	1050	100
	JUL	MAX	7218	26	6.8	3.95	45	113	3.7	129	757	100
		MIN	2773	18	6.6	0.30	4	4	1.7	37	220	75
		AVE	4403	23	6.7	1.65	19	46	2.5	60	351	89
	AUG	MAX	3950	25	7.1	1.68	20	28	5.5	117	690	110
		MIN	2650	23	6.6	0.20	2	4	1.6	27	157	90
		AVE	3149	24	6.8	0.63	8	10	3.6	64	378	101
	SEP	MAX	5950	23	6.4	1.85	21	25	2.0	64	378	95
		MIN	3224	18	6.3	0.30	3	5	1.2	16	96	80
		AVE	3708	21	6.4	0.85	10	14	1.6	33	194	86
1960	JUN	MAX	5942	21	6.7	4.25	46	136	4.1	108	648	90
		MIN	4387	19	6.6	0.75	8	18	2.1	50	300	55
		AVE	4971	20	6.6	2.29	25	64	2.9	77	465	75
	JUL	MAX	4245	24	6.9	1.68	20	33	3.2	73	436	100
		MIN	3072	22	6.6	0.23	3	3	1.3	26	154	80
		AVE	3793	23	6.7	0.60	7	10	2.5	51	306	93
	AUG	MAX	4186	23	6.8	0.30	3	6	3.4	77	461	100
		MIN	3610	22	6.6	0.10	1	2	1.0	20	117	85
		AVE	3788	23	6.7	0.21	2	4	2.0	51	246	91
	SEP	MAX	8003	23	6.6	4.28	44	90	4.3	117	702	110
		MIN	3158	16	6.5	0.10	1	2	1.5	32	190	80
		AVE	4262	19	6.5	1.55	16	23	3.0	66	397	96
1961	JUN	MAX	7405	21	6.6	8.20	78	293	2.4	86	504	75
		MIN	4305	13	6.4	1.90	21	44	2.0	49	287	60
		AVE	5780	18	6.5	5.12	52	173	2.2	68	400	66
	JUL	MAX	4495	26	6.7	0.80	10	19	3.2	73	431	90
		MIN	4230	22	6.4	0.23	3	5	1.1	27	157	75
		AVE	4345	24	6.5	0.44	6	10	1.9	44	257	84
	AUG	MAX	3955	26	6.5	0.45	5	9	2.9	58	339	100
		MIN	2989	22	6.4	0.20	2	4	1.1	23	135	85
		AVE	3492	24	6.5	0.28	3	5	2.2	41	240	93
	SEP	MAX	4090	24	6.8	3.20	36	71	1.5	33	195	90
		MIN	2810	21	6.6	1.08	13	18	0.8	12	71	90
		AVE	3298	22	6.7	1.92	22	36	1.0	19	111	90

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 11a - River Mile 33.7

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS./DAY	B.O.D. mg/l	B.O.D. 1000 LBS./DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	3954	24	6.5	0.35	4	7	16.5	276	1623	150
		MIN	2993	19	6.1	0.05	1	1	7.8	167	979	140
		AVE	3443	21	6.4	0.19	2	4	13.4	241	1418	148
	JUL	MAX	3696	24	6.8	0.40	5	6	8.1	100	587	150
		MIN	594	22	6.6	0.15	2	1	2.0	26	153	60
		AVE	2660	24	6.7	0.25	3	3	4.9	59	348	103
	AUG	MAX	3708	23	6.8	0.25	3	5	5.1	102	600	80
		MIN	2663	21	6.4	0.15	2	3	2.1	33	194	60
		AVE	3239	22	6.6	0.20	2	4	3.7	66	386	71
	SEP	MAX	3241	21	6.8	0.32	4	6	3.7	52	308	100
		MIN	2575	19	6.6	0.13	1	2	2.8	44	262	85
		AVE	2902	21	6.6	0.22	3	3	3.2	49	290	94
1959	JUN	MAX	10885	21	6.8	7.60	75	447	8.9	282	1660	110
		MIN	3620	15	6.6	0.18	2	4	2.2	73	430	65
		AVE	6179	19	6.7	3.62	37	168	6.0	172	1039	94
	JUL	MAX	7218	26	6.8	3.50	38	136	4.4	144	848	110
		MIN	2773	19	6.5	0.40	5	6	1.4	32	187	80
		AVE	4403	24	6.7	1.55	18	55	2.7	65	383	91
	AUG	MAX	3950	25	6.9	0.65	8	11	5.5	117	690	110
		MIN	2650	24	6.7	0.15	2	3	1.4	23	137	95
		AVE	3149	25	6.8	0.34	4	6	3.8	66	390	104
	SEP	MAX	5950	23	6.4	1.73	20	56	3.7	80	472	110
		MIN	2514	18	6.2	0.50	5	9	0.9	15	88	80
		AVE	3708	21	6.3	1.31	15	27	2.1	44	257	95
1960	JUN	MAX	5942	22	6.6	5.55	60	178	4.0	105	630	90
		MIN	4387	19	6.5	0.65	7	16	1.9	57	341	60
		AVE	4971	21	6.6	2.77	30	79	2.7	72	432	77
	JUL	MAX	4245	24	6.7	0.75	9	15	3.1	71	426	95
		MIN	3072	22	6.6	0.25	3	4	1.9	38	226	90
		AVE	3793	23	6.7	0.45	5	9	2.4	50	296	93
	AUG	MAX	4186	24	6.7	0.70	8	14	3.0	68	407	100
		MIN	3610	23	6.5	0.25	3	5	1.5	29	176	85
		AVE	3788	23	6.6	0.40	5	8	2.1	44	262	90
	SEP	MAX	8003	24	6.7	8.00	86	346	3.6	156	936	100
		MIN	2975	17	6.5	0.15	2	2	1.3	27	164	85
		AVE	4262	20	6.6	2.90	31	98	2.6	66	398	95
1961	JUN	MAX	7405	22	6.6	8.50	83	304	2.7	80	470	80
		MIN	4305	14	6.4	2.00	23	46	2.0	46	273	65
		AVE	5780	19	6.5	5.35	56	132	2.3	70	411	71
	JUL	MAX	4495	26	6.6	2.40	29	58	2.8	64	377	100
		MIN	4230	22	6.3	0.48	6	11	1.9	46	271	80
		AVE	4345	24	6.4	1.08	13	26	2.3	54	317	92
	AUG	MAX	3955	26	6.5	0.55	7	10	2.7	58	339	100
		MIN	2989	23	6.4	0.30	3	5	1.4	29	172	85
		AVE	3492	24	6.4	0.43	5	8	2.2	41	240	93
	SEP	MAX	4090	24	6.8	2.55	29	56	1.5	25	149	100
		MIN	2810	21	6.5	0.80	9	13	1.1	18	107	90
		AVE	3298	22	6.7	1.58	18	30	1.2	22	127	98

...PONT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
...ampbell - Station 11b - River Mile 30.5

YEAR	MO.		FLOW cfs	TEMP °C	pH	D.O mg/l	% SAT	D.O. 1000 LBS/DAY	B.O.D. mg/l	B.O.D. 1000 LBS/DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	3954	22	6.2	1.05	11	22	16.6	278	1633	150
		MIN	2993	18	6.1	0.05	1	1	7.0	149	879	140
		AVE	3443	21	6.2	0.38	4	8	13.1	[illegible]	1391	145
	JUL	MAX	3696	23	6.8	1.20	14	24	3.4	68	399	130
		MIN	594	22	6.6	0.30	3	5	1.9	33	194	70
		AVE	2660	23	6.7	0.76	9	14	2.7	50	296	93
	AUG	MAX	3708	23	6.6	0.78	9	16	4.6	92	542	80
		MIN	2663	20	6.4	0.45	5	8	1.4	25	145	60
		AVE	3299	22	6.5	0.61	7	11	3.1	55	326	72
	SEP	MAX	3241	20	6.8	0.70	8	12	2.4	42	247	120
		MIN	2575	19	6.6	0.40	4	6	2.0	29	172	100
		AVE	2902	20	6.8	0.56	6	9	2.2	34	199	109
1959	JUN	MAX	10885	21	6.7	8.45	84	497	6.2	265	1556	110
		MIN	3620	15	6.6	0.23	3	4	2.2	73	430	65
		AVE	6179	19	6.7	4.08	42	188	4.7	148	868	94
	JUL	MAX	7218	25	6.8	4.68	49	182	3.5	136	802	100
		MIN	2773	18	6.6	0.85	10	11	1.6	30	176	80
		AVE	4403	23	6.7	2.25	25	64	2.1	55	326	90
	AUG	MAX	3950	25	6.8	1.40	17	23	4.1	87	514	110
		MIN	2908	[illegible]	6.6	0.50	6	7	1.1	18	108	95
		AVE	3149	[illegible]	6.7	0.73	9	12	2.8	48	285	104
	SEP	MAX	5950	23	6.5	2.70	29	71	3.1	71	416	110
		MIN	2514	17	6.3	1.25	13	22	1.1	16	96	80
		AVE	3708	20	6.4	2.18	24	43	1.9	40	235	93
1960	JUN	MAX	5942	22	6.7	5.80	62	186	3.9	103	618	90
		MIN	4387	19	6.5	1.23	14	29	2.0	59	356	65
		AVE	4971	20	6.6	3.57	39	99	3.0	79	471	77
	JUL	MAX	4245	23	6.9	1.58	18	31	2.0	45	272	95
		MIN	3072	22	6.6	0.35	4	6	1.4	28	163	90
		AVE	3793	23	6.6	1.00	12	21	1.7	35	209	93
	AUG	MAX	4186	23	6.7	1.60	18	31	2.8	63	380	110
		MIN	3610	22	6.6	0.70	8	16	1.1	22	129	85
		AVE	3788	23	6.6	0.99	11	20	1.7	35	211	93
	SEP	MAX	8003	23	6.7	8.00	88	346	3.6	156	936	100
		MIN	3158	16	6.5	0.25	3	4	1.2	25	152	85
		AVE	4262	19	6.6	4.57	47	102	2.4	61	364	93
1961	JUN	MAX	7405	21	6.6	8.95	85	328	2.6	88	517	80
		MIN	4305	13	6.5	2.90	32	67	2.2	51	301	65
		AVE	5780	18	6.6	5.93	61	200	2.4	73	431	69
	JUL	MAX	4495	25	6.7	1.60	19	39	2.4	55	323	100
		MIN	4230	22	6.3	1.10	12	26	1.7	41	242	80
		AVE	4345	23	6.4	1.37	16	32	2.0	46	272	90
	AUG	MAX	3955	24	6.6	1.60	18	33	1.9	41	239	100
		MIN	2989	22	6.4	0.75	9	14	1.1	23	135	85
		AVE	3492	23	6.5	1.00	12	19	1.5	29	168	95
	SEP	MAX	4020	24	6.7	3.30	37	73	1.4	27	156	100
		MIN	2810	21	6.5	1.35	16	23	1.0	15	89	90
		AVE	3238	22	6.6	2.32	26	43	1.2	21	124	98

REPORT ON ANDROSCOGGIN RIVER
NEW HAMPSHIRE-MAINE
Sampling Station 12 - River Mile 15.7

YEAR	MO.		FLOW c.f.s.	TEMP °C	pH	D.O. mg/l	% SAT	D.O. 1000 LBS/DAY	B.O.D. mg/l	B.O.D. 1000 LBS/DAY	P.E. 1000 CAP	COLOR
1957	JUN	MAX	4408	22	6.5	8.10	95	193	7.5	139	817	150
		MIN	3296	18	6.4	0.95	10	18	5.0	96	565	140
		AVE	3814	21	6.5	5.50	63	118	5.8	119	697	145
	JUL	MAX	4017	24	7.2	8.13	93	176	5.2	96	566	140
		MIN	716	22	6.5	7.20	83	28	2.8	18	107	70
		AVE	2927	23	6.9	7.52	87	120	4.2	58	343	110
	AUG	MAX	4058	24	6.9	7.60	86	160	2.5	55	322	90
		MIN	2843	20	6.7	7.03	80	108	2.3	38	226	65
		AVE	3469	22	6.8	7.34	83	138	2.4	46	269	73
	SEP	MAX	3420	21	7.0	7.68	81	138	2.9	54	315	130
		MIN	2730	18	6.9	6.70	73	99	2.1	32	186	100
		AVE	3067	20	7.0	7.09	77	118	2.6	42	249	115
1959	JUN	MAX	11750	21	7.0	9.95	100	631	4.4	279	1642	110
		MIN	3970	16	6.7	7.80	87	17	1.9	73	427	65
		AVE	6808	19	6.8	8.86	94	302	3.5	132	777	91
	JUL	MAX	8020	26	7.0	9.20	99	398	3.2	139	815	100
		MIN	3080	19	6.8	7.40	89	123	1.3	34	199	80
		AVE	4914	23	6.9	8.17	94	222	2.1	59	345	88
	AUG	MAX	4190	25	7.1	7.30	87	156	2.6	57	333	110
		MIN	2880	24	6.9	6.90	81	110	1.7	26	156	90
		AVE	3378	24	7.0	7.10	84	129	2.1	39	231	100
	SEP	MAX	6600	22	6.6	9.70	100	290	2.5	89	524	110
		MIN	3355	18	6.5	7.60	82	140	1.2	24	144	80
		AVE	4286	20	6.6	8.40	92	193	2.0	47	277	91
1960	JUN	MAX	6942	23	7.0	9.15	97	343	3.2	108	648	90
		MIN	4892	18	6.7	7.73	89	204	2.0	54	326	60
		AVE	5753	20	6.8	8.56	93	268	2.9	89	535	76
	JUL	MAX	4656	23	7.0	8.48	97	210	2.3	57	342	100
		MIN	3368	23	6.9	7.20	83	131	1.6	29	175	85
		AVE	4185	23	6.9	8.00	91	181	2.0	45	269	91
	AUG	MAX	4532	24	7.0	7.95	91	195	2.9	71	427	100
		MIN	3770	22	6.9	7.75	89	158	1.4	29	175	90
		AVE	4038	23	6.9	7.90	90	172	1.9	42	254	93
	SEP	MAX	8776	24	7.0	9.38	100	441	3.6	48	285	100
		MIN	3203	17	6.7	6.95	80	120	1.6	17	103	80
		AVE	4625	20	6.8	8.40	91	216	2.4	36	213	92
1961	JUN	MAX	8024	22	6.8	10.30	100	422	3.2	131	771	75
		MIN	4434	14	6.6	8.10	92	194	2.4	57	338	65
		AVE	6360	18	6.7	9.18	96	320	2.9	102	601	68
	JUL	MAX	4851	24	6.9	9.18	99	215	2.0	52	305	90
		MIN	4573	22	6.8	8.10	91	202	1.6	42	246	75
		AVE	4705	23	6.9	8.22	95	209	1.8	46	272	84
	AUG	MAX	4161	26	6.9	8.45	97	190	2.4	54	317	90
		MIN	3152	22	6.8	7.05	85	120	1.5	30	178	90
		AVE	3677	24	6.8	7.98	93	159	1.9	37	218	90
	SEP	MAX	4439	24	7.0	8.80	98	211	1.8	43	254	100
		MIN	2997	21	6.8	7.38	86	121	1.4	23	133	90
		AVE	3530	22	6.9	7.84	90	151	1.6	31	184	92

REPORT ON

ANDROSCOGGIN RIVER

New Hampshire-Maine

APPENDIX B

FLOW CALCULATIONS

The flows at each of the fourteen sampling stations along the Androscoggin River are based on drainage areas and relative yields obtained from work done by C. J. Velz and daily flows recorded at U.S.G.S. gages.

The daily flows at Sample Station 1 (Bell's Icehouse, River Mile 138.8) is based on the assumption that flow increases in direct proportion to the increase in drainage area. Thus, the flow at a sampling station between two U.S.G.S. gages will be the recorded flow at the upstream gage plus a computed increment of flow. The increment of flow is computed by multiplying the difference in recorded flows, between the upstream and downstream gages, by the ratio of the increase in drainage area, between the upstream gage and the sampling station, to the total increase in drainage area between the gages. Since the drainage area from the U.S.G.S. gage at Errol to Bell's Icehouse is 77 percent that from the Errol gage

to the Gorham gage, the sampling station flow is assumed to have the same flow as at the Errol gage plus 77 percent of the flow increment between the two gages.

The daily flows at Sample Station 2 (Twin State or Gorham, River Mile 130.4) are computed in the same manner as for Sample Station 1 except that the flows from the U.S.G.S. gages at Gorham and Rumford are used. The Twin State (or Gorham sampling station) flow is computed as 20 percent the gage flow increment plus the recorded flow at the Gorham gage.

The daily flows for Sample Station 3 (Gilead, River Mile 119.2), Sample Station 4 (Bethel, River Mile 109.0), and Sample Station 5 (Rumford Point, River Mile 92.7), were computed exactly like the Twin State flows except that 38.1 percent, 46.4 percent, and 95.9 percent, respectively, were used instead of 20 percent.

The daily flows for Sample Station 6 (Rumford, River Mile 87.6) are the recorded flows from the U.S.G.S. gage at Rumford.

The daily flows at Sample Station 7 (Dixfield, River Mile 82.0) are the product of the daily yields at the U.S.G.S. gage at Rumford, in cubic feet per second per square mile, and the drainage area, in square miles, at the sampling station. The flows for Sample Station 8 (Riley, River Mile 65.5), Sample Station 9 (North Turner, River Mile 49.0), and Sample Station 10 (Turner Center, River Mile 42.0) are similarly based on 93 percent, 88 percent, and 84 percent, respectively, of the Rumford yield.

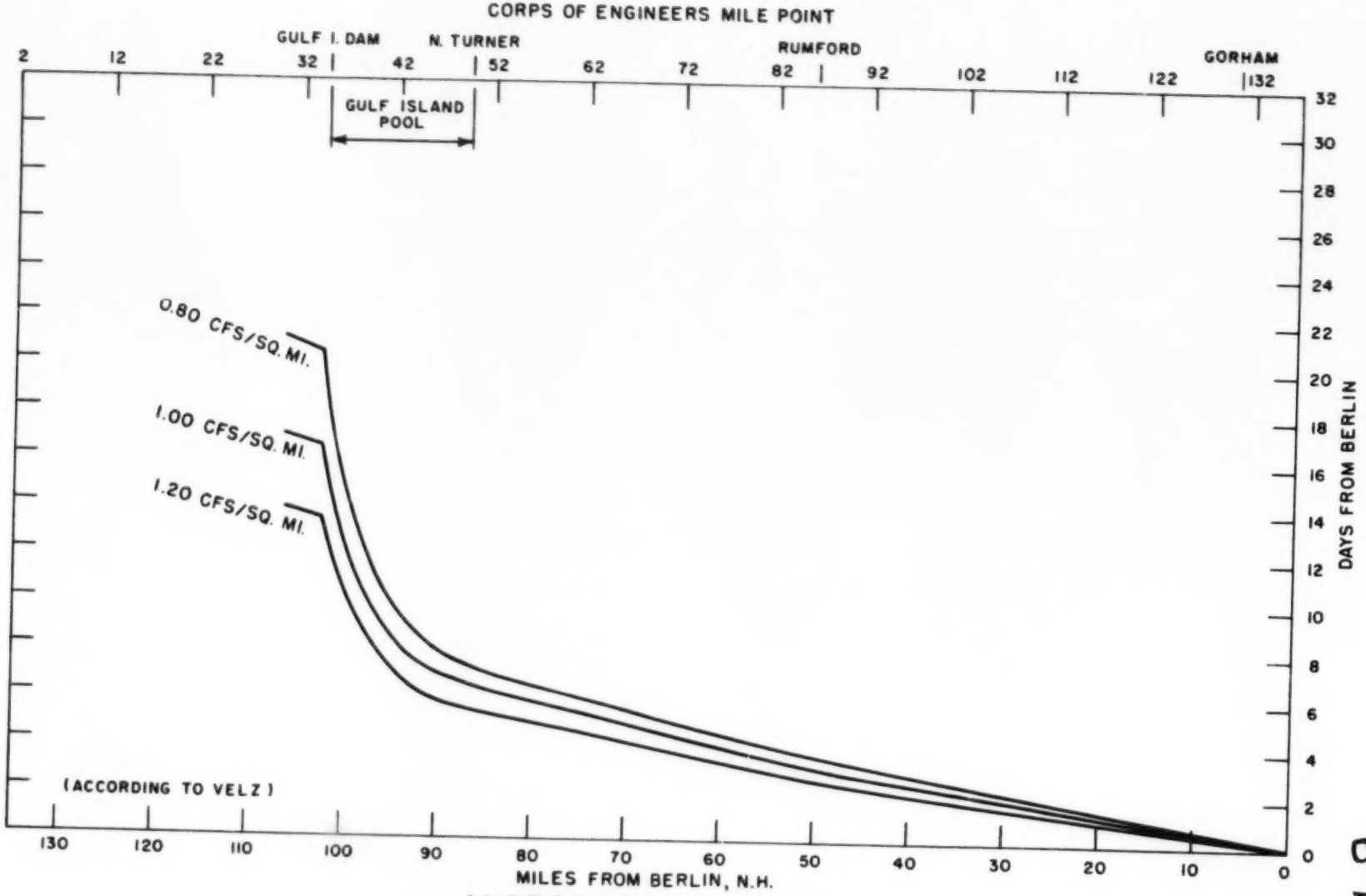
Sample Stations 9 and 10 are both located in Gulf Island Pool.

The daily flows at Sample Station 11 (Gulf Island, River Mile 34.4), Sample Station 11A (Deer Rips, River Mile 33.7), and Sample Station 11B (Lewiston, River Mile 30.5) in absence of further data, are assumed to be equivalent to the difference between the recorded flows at the U.S.G.S. gages on the Androscoggin and Little Androscoggin Rivers near Auburn.

The daily flows at Sample Station 12 (Lisbon Falls, River Mile 15.7) are the products of the daily yields, in cubic feet per second per square mile, at the Auburn U.S.G.S. gage on the Androscoggin River and the drainage area, in square miles, at the Lisbon Falls sampling station.

TIME OF PASSAGE

Time of passage along the Androscoggin River was determined through the use of curves formulated by Prof. C. J. Velz and shown in the following chart - "Time of Passage for Varied Yields" (Chart AP - II - A). The time of passage from Berlin to any sampling station was determined from the curves by computing the distance in miles of the sampling station to Berlin and the mean summer yield, at the sampling station in cfs per square mile. This information was applied to the appropriate yield curve or a reasonable interpolation and the time of passage, in days from Berlin, was read from the vertical scale.



B-4

ANDROSCOGGIN RIVER
TIME OF PASSAGE FOR VARIED YIELDS
GULF ISLAND POOL CONSIDERED FULL AT CREST ELEVATION 262
CHART AP-II-A

REPORT ON

ANDROSCOGGIN RIVER

New Hampshire-Maine

APPENDIX C

CALCULATED COLIFORM QUANTITIES

August 1959

Station	Location Description	MPN/100 ml	Flow Data cfs	Coliform Per Day (In Billions)
1 RM138.8	Bells (Above Berlin)	0+	2023	
	Berlin Sewer	7,600		400,000+
2 RM130.4	Twin State Canal from Berlin	63,500	2062	3,200,000
	Subtotal from Upstream	63,500		3,200,000
	from Gorham Sewer	1,300		67,000
	Total	64,800		3,267,000
	Shelburne=Berlin Peak	119,000		
	from Gorham	11,100		
	Total	130,100		6,560,000
	N.H.-Me. State Line from Berlin	98,700		
	from Gorham	15,900		
	Total	114,600		5,780,000
3 RM119.2	Gilead Bridge from Berlin	67,000	2093	
	Gorham Peak	20,000		
	Total	87,000		4,380,000
4 RM109.0	Bethel from Berlin	29,100	2112	
	from Gorham	11,300		
	Subtotal from Upstream	40,000		2,080,000
	from Bethel Sewer	600		32,000
	Total	41,000		2,112,000
	Bethel Peak from Berlin	15,100		
	from Gorham	5,800		
	from Bethel	9,300		
	Total	30,200		1,560,000

APPENDIX C - Continued

Station	Location Description	MPN/100 ml	Flow Data cfs	Coliform Per Day (In Billions)
5 RM92.7	Rumford Point from Berlin	12,200	2223	
	from Gorham	4,600		
	from Bethel	7,400		
	Total	24,200		1,310,000
6 RM87.6	Rumford from Berlin	6,400	2232	
	from Gorham	2,400		
	from Berlin	3,800		
	Subtotal from Upstream	12,600		685,000
	from Rumford Sewer[1]	6,000		326,000
	Total	18,600		1,011,000
	Rumford Peak from Berlin	3,400		
	from Gorham	1,200		
	from Bethel	2,000		
	from Rumford	90,500		
	Total	97,100		5,230,000
8 RM65.5	Riley from Berlin	1,200	2635	
	from Gorham	400		
	from Bethel	600		
	from Rumford	28,500		
	Total	30,700		1,970,000
	Livermore from Berlin	1,000		
	from Gorham	300		
	from Bethel	500		
	from Rumford	22,600		
	Subtotal from Upstream	24,400		1,580,000
	from Livermore Sewer	1,100		69,000
	Total	25,500		1,649,000
	Livermore Peak from Berlin	600		
	from Gorham	200		
	from Bethel	300		
	from Rumford	11,700		
	from Livermore	16,100		
	Total	28,900		1,860,000
9 RM49.0	No. Turner Bridge from Berlin	100	2677	
	from Rumford	1,200		
	from Livermore	3,300		
	Total	4,600		302,000

(1) Rumford figures include Mexico & Dixfield

APPENDIX C - Continued

Station	Location Description	MPN/100 ml	Flow Data cfs	Coliform Per Day (In Billions)
10 RM42.0	Turner Center Bridge from Rumford	300	2720	
	from Livermore	800		
	Total	1,100		72,000
11 RM34.4	Gulf Island from Rumford	100	3149	
	from Livermore	200		
	Total	300		17,000
11a RM33.7	Deer Rips from Rumford	100	3149	
	from Livermore	200		
	Total	300		16,000
11b RM30.5	Auburn-Lewiston from Upstream	0+	3149	
	from Auburn-Lewiston	15,700		
	from Little Androscoggin	31,100		
	Total	46,800		3,630,000
	Auburn Peak from Auburn-Lewiston	237,000		
	from Little Androscoggin	15,800		
	Total	252,800		19,400,000
	Intermediate Point from Auburn	181,000		
	from Little Androscoggin	12,400		
	Total	193,400		15,500,000
12 RM15.7	Lisbon Falls from Auburn-Lewiston	91,000	3378	
	from Little Androscoggin	6,200		
	Subtotal from Upstream	97,200		8,000,000
	from Lisbon Falls Sewer	700		60,000
	Total	97,900		8,060,000
	Lisbon Falls Peak from Aub-Lew.	46,000		
	from Little Androscoggin	3,200		
	from Lisbon Falls	10,600		
	Total	59,800		4,970,000
	Brunswick from Auburn-Lewiston	37,000		
	from Little Androscoggin	2,600		
	from Lisbon Falls	8,400		
	Subtotal from Upstream	48,000		4,000,000
	from Brunswick Sewer	4,600		386,000
	Total	52,600		4,386,000

APPENDIX C - Continued

Station	Location Description	MPN/100 ml	Flow Data cfs	Coliform Per Day (In Billions)
	Brunswick Peak from Aub-Lew.	19,100		
	from Little Androscoggin	1,300		
	from Lisbon Falls	4,300		
	from Brunswick	68,400		
	Total	93,100		7,870,000